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DECEMBER 1919

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THE ARCHITECTURAL FORUM

VOLUME XXXI

NUMBER 6

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ALBERT J. MacDONALD, Editor

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VIEW THROUGH COLONNADE OF
MUNICIPAL BUILDING, NEW YORK CITY
McKIM, MEAD & WHITE, ARCHITECTS
Photograph by John Wallace Gillies

THE ARCHITECTURAL FORUM

FOR QUARTER CENTURY THE BRICKBUILDER

VOLUME XXXI

DECEMBER 1919

NUMBER 6

✓ The Apartment Building for Moderate Rentals

By ELISHA HARRIS JANES

PART II

A NEW era in modes of living, brought about by many new conditions, is influencing many to seek apartments who have never given it a thought before, one of the important conditions being the servant problem, causing many people to give up private houses which require two or more servants, and others to change from large apartments requiring one or more servants to smaller and more compact ones, where they are not a necessity. A second cause is the very serious problem of the raising of rents, resulting in the demand for still fewer rooms to keep within the rent budget. For this reason some owners have altered their buildings by cutting one apartment into two and with the same number of rooms almost doubling the total rental. But with all these difficulties the public are becoming more and more particular and discriminating. The new generation has been brought up in the older apartments and is learning what to look for and what can be done.

Conditions are improving because the operators are making a greater study of the problem through the realization that to make an operation a success the tenant must be pleased and his demands met. They can no longer go on the principle that, as one type was a success in one neighborhood a few years ago, it can therefore be repeated in another location and be just as successful.

Some of the apartment builders deserve great credit for the careful manner in which they study the wants of the tenants, whether it be for economy or to please the tenant; some keep careful notes tabulated of all the requests for changes, complaints or criticisms of the apartments, closets, kitchens, etc. By the intelligent use of such data in the building of another apartment they are able to accomplish many savings; as an example, in one apartment house there were many requests for the removal of certain doors; in the next one erected they were omitted, amounting to something like sixty doors — quite an item. In another case it was found shower baths could be omitted from over the tubs. These may seem small details, but

a few of them soon amount to a large sum, and they are some of the points that make it difficult for the inexperienced architect and the one who is designing his first apartment.

The planning of an apartment house is entirely different from any other architectural problem: there are no prototypes; the standards are always changing of necessity, due to different manners of living, and only close study with the renting agents of the wants of the tenants will produce a successful building from every standpoint. The average tenant is as particular in taste in the selecting of her apartment as in her dress, and in the course of a few years changes her ideas entirely — perhaps in location, the number of rooms desired, etc.

There is, perhaps, more detailed work to be considered in apartment house building than in any other type of structure. This statement at first will not be believed and will be contradicted. At first thought it does seem, for example, that a residence would receive much more detailed consideration; but a moment's reflection recalls that in a residence the architect has only to build for and please the one owner. In the apartment he has to build for and please as many tenants as are going to occupy the apartments for years to come, — that is, if he puts his conscientious efforts in it, — as well as the owner, who is looking for a profitable investment.

It must be admitted that the first consideration is to make the operation of the building a financial success and, secondarily, an architectural success. Fortunately they both generally run together. But each detail, each feature, has to be weighed and considered as to how it will affect the first. In the previous paper the direct financial sides were considered in detail, the part affecting the owner; in this paper we want to consider the other side, the intimate and personal side which caters to the tenant, attracts him and helps keep the building fully tenanted, thus insuring the success as figured in the financial side.

Having established the location and the type of building, there now follows the discussion, inas-

much as the exterior is first to attract the eye, as to how expensive a type of façade should be chosen. Considering the economic side, it is very difficult to decide when and where expense is warranted.

In certain locations the simplest and plainest type will be a success. In other places it is absolutely necessary to make a more or less elaborate design. As an example, in 1903 one of the first twelve-story apartments was built in New York, The Dorilton, and as it was pioneering to a certain extent, it was decided after long conferences to make the building figuratively "shout"—to make it talked about. At this time the earlier students were returning from the Ecole des Beaux Arts and introducing the bold French architecture. This style was therefore used and a considerable amount was spent on the façade, with the result as anticipated. The building was a success from the time it was opened and has remained so. It is probably known by more people than any other one in the city. This, of course, is an extreme case.

On the other hand, an apartment of the usual type, built in a district where there is a great demand for apartments, will be a success, no matter what the design of the façade; and a simple design

in simple materials, which has sufficient refinement to attract the better class of tenants, is the most advisable. There is one good characteristic about the speculative builder,—he copies fairly well a building that has proven a success. This, coupled with the fact that the former types with heavy metal cornices, fancy terra cotta, etc., were not only more expensive, but the upkeep was much greater than the quiet, refined and simple design

now popular, has caused great changes in the general character of façades for apartments.

Undoubtedly the most appropriate is one that gives the appearance of a residence. These have been carried out exceptionally well in some of the Chicago and Boston apartments.

Several exteriors are published which show what splendid compositions may be designed when treated in large units, some giving a suburban appearance as the "Gables," and another resembling the Manor architecture of England. The use of a large front court from

40 to 50 feet wide, and the several entrances arranged from its three sides, give a feeling of privacy and quiet.

The apartment illustrated on Post avenue, New York, has some half timber work and gables cleverly introduced without reducing the full head-



The Dorilton Apartments, New York
An Early Type Illustrating the Influence of L'Ecole des Beaux Arts
Eliasha Harris Jones, Architect



Sterling Apartments, Chicago, Ill.
Robert L. Kane, Architect

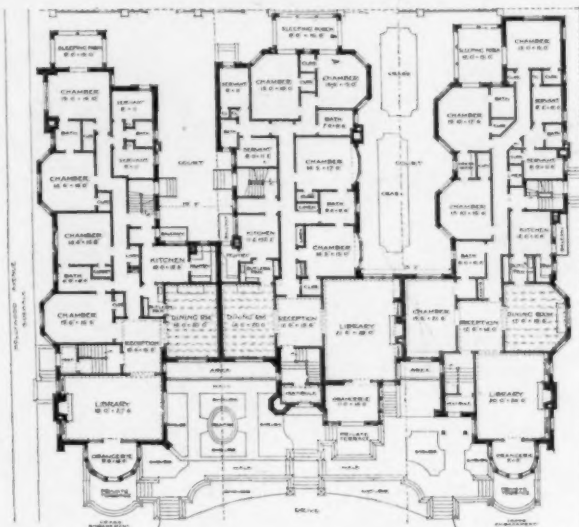
room of the top story, and the corners are made into blind chimneys. It is unfortunately spoiled by the exterior fire-escapes.

The design by Mr. A. J. Thomas, illustrated on page 186, which received the gold medal of the New York Chapter of the Institute, has been copied extensively, more or less successfully. Combining, as it does, taste and refinement with economy, it appeals to the speculator.

Next to the façade comes the entrance and vestibule—an important influence with women. Where many apartment builders neglect the façade they have realized the importance of the entrance and strive for something pretentious, sometimes resulting happily, but more often very much overdone from a decorative standpoint. A plain, simple and dignified one is undoubtedly the best.

Whether there should be a reception room depends upon the character and manner in which the building is to be operated. If visitors are to be announced, one is necessary. Otherwise an attractive hall will suffice. Careful consideration should be given to the location of the telephone switchboard, stairs and entrance to the elevators, as these produce the first and last impression upon a prospective tenant.

The question whether the ground floor shall be used for stores or not is generally decided by the location. Where the apartment house is on a thoroughfare or business street, it is practically obligatory. At times though, when an apartment is erected in advance of the business, the stores are omitted; but in such cases it is advisable to have the entrances on the unimportant street, so that



First Floor Plan



The Gables Apartments, Chicago, Ill.
J. E. O. Pridmore, Architect

the portion on the main street may be changed to stores without much alteration, if desired, at a later date. There is no doubt that it is objectionable to have stores, and it not only affects the rents, but also the class of tenants; but this is generally overcome by the higher rents obtained from the business premises. Again it is a matter of figures.

The moving in of furniture presents a serious problem in apartments, specially the non-elevator ones. The movers have little respect for the walls, trim, etc., and much damage is caused by them. It is therefore necessary to arrange the access so as to eliminate as much as possible the chances of damage. It is an item to which too little importance is given when considering the question of a rear entrance or service elevator. The halls should be wide and with few turns, and the decoration such that cannot be easily damaged; yet if damaged, easily repaired. It is a fortunate thing, however, that dwellers of apartments usually have little furniture.

In the early apartment it was thought necessary to have long halls in order to reach each room. This is eliminated in the better designed houses as described before. In larger apartments the long



Apartment House, 204th Street, Bronx, New York



Typical Floor Plan of Above
Andrew J. Thomas, Architect



Apartment Houses, Post Avenue and 204th Street, Bronx, New York
Fred F. French Company, Architects

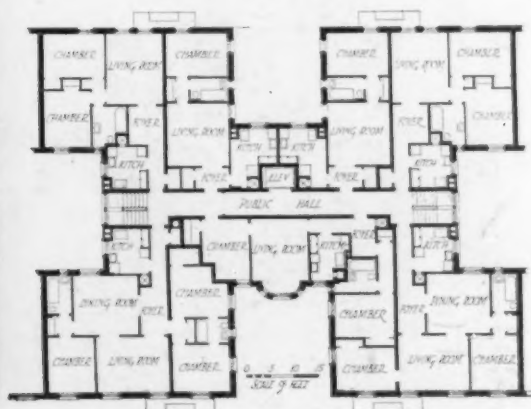


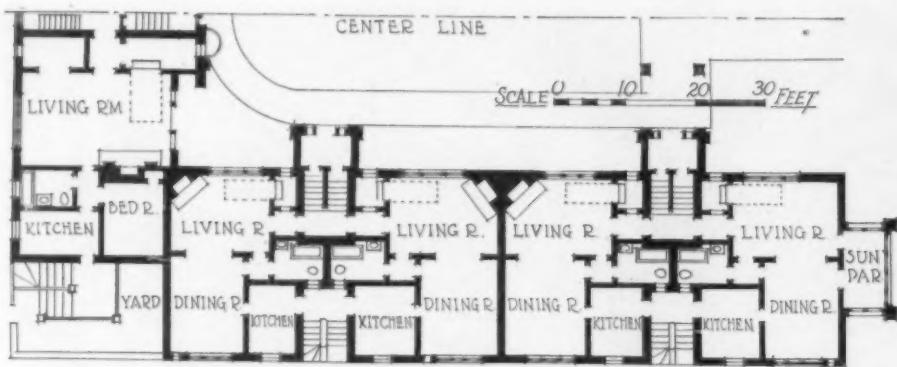
DETAIL OF AN END ENTRANCE COURT



APARTMENT HOUSES, 115-135 WEST 16TH STREET, NEW YORK, N. Y.
G. A. & H. BOEHM, ARCHITECTS

THIS group of apartments is composed of three units similar to that shown in plan. The plan illustrated is the typical floor of the center unit and is similar in all respects to the end units, with the exception of the bay window in the entrance court. The first floor provides for two doctors' suites in each unit arranged on either side of the entrance with individual entrances as shown in the illustration above. The apartments vary in size from two to five rooms, with bath and conveniently arranged kitchen. Service to each apartment is provided from the basement by dumb waiter.

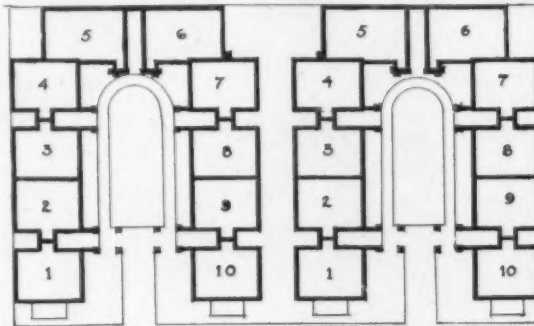




Detailed First Floor Plan of One Wing, Kellshore Apartments

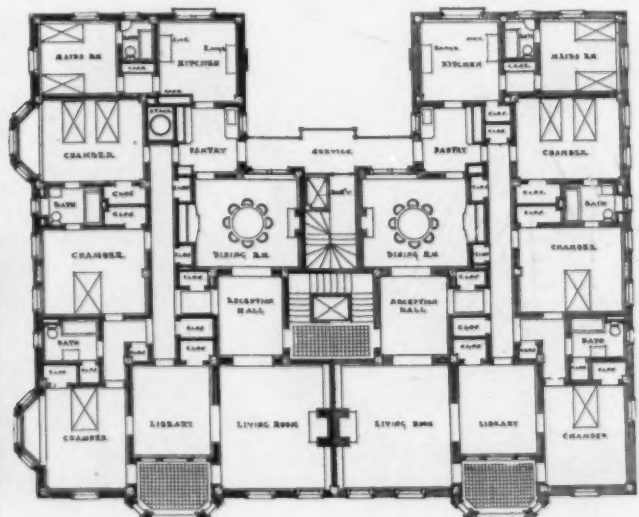
hall is sometimes necessary, but in those cases it is well to modify it by a foyer. This without wasting room gives a generous, hospitable entrance, allowing a place to put one's coat and hat.

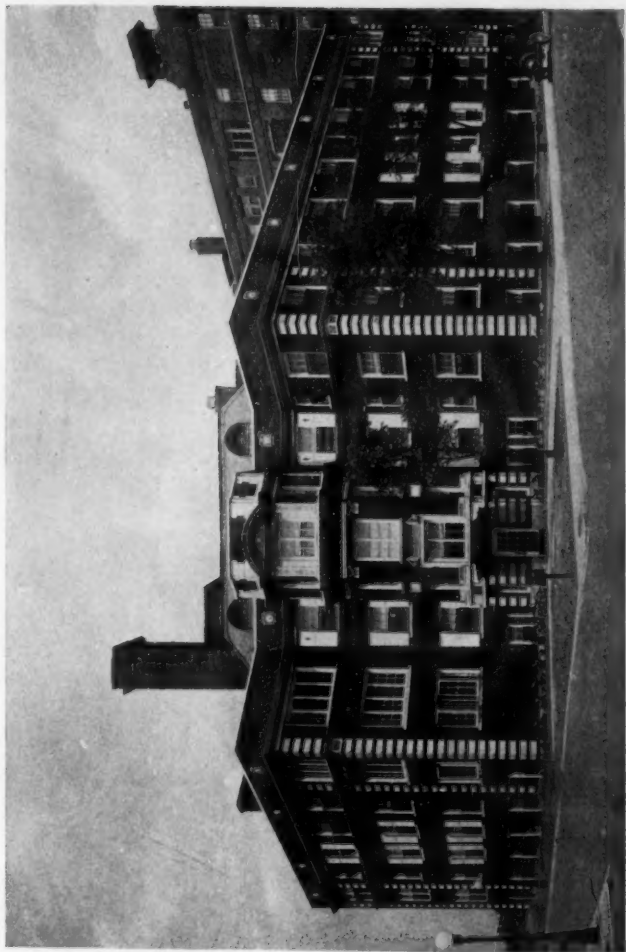
The most inexcusable mistake in many apartments is the location of the bathroom. No one would ever think of placing the bathroom in a private house on the first floor by the front door. Yet that is precisely what is done in many apartments. It should be placed next to the chambers and as far from the entrance and living room as possible, even though it cost an extra stack of plumbing. It will be repaid. It is attractive to have the bath open off the main chamber

Block Plan, Kellshore Apartments, Chicago, Ill.
E. Norman Brydges, Architect

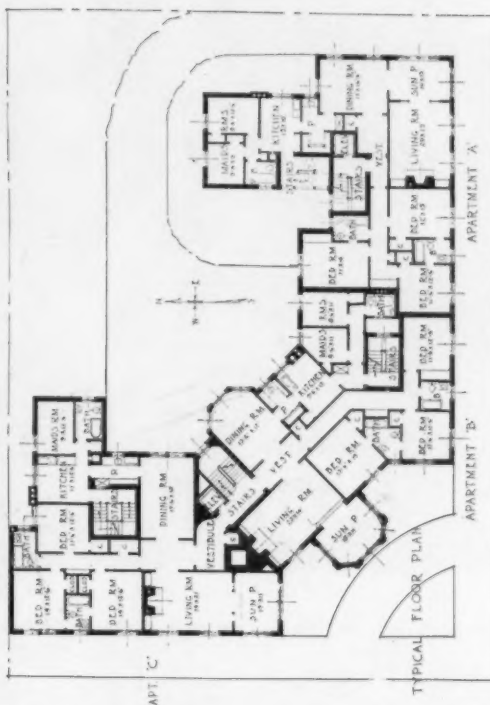
be done. With the plumbing it is economy to arrange a pipe shaft where repairs can easily be made without damage to the building or decorations.

The location of the kitchen is one of the most difficult problems. The Chicago and Boston apartments often answer it successfully by having rear entrances from alleys. This is the ideal solution in walk-ups, but it is not always practicable. The scheme of a service elevator that supplies several apartments of course is most convenient, but lacking that service must be by dumbwaiter. These

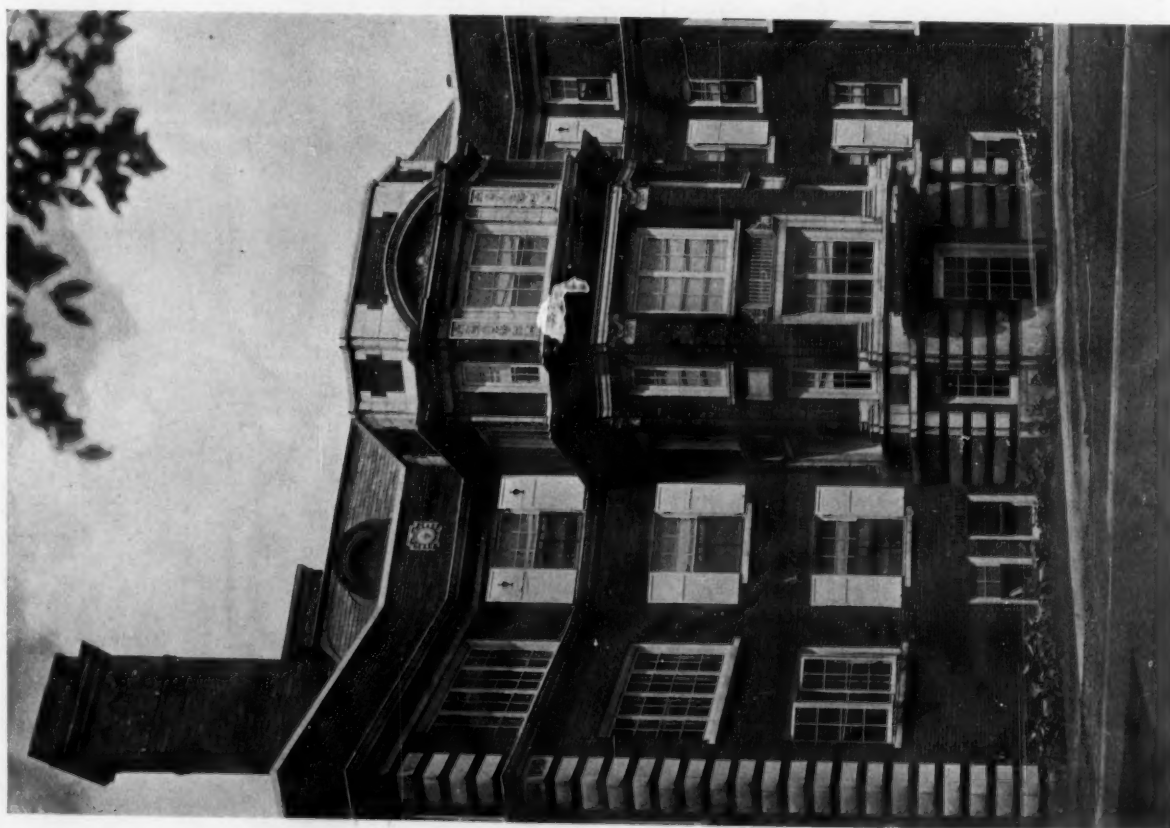
General View and Typical Floor Plan of Kingsbury Apartments, St. Louis, Mo.
La Beume & Klein, Architects



GENERAL VIEW OF EXTERIOR



THIS plan gives the openness of a private house in its arrangement of principal rooms in a comparatively small space. The main rooms of all apartments have street frontage. There are three apartments of practically the same size to each floor. Sun parlors are an important feature and have been incorporated without depriving any of the rooms of direct daylight.



APARTMENT HOUSE, 205 DELAWARE PLACE, CHICAGO, ILL.
CHATTEN & HAMMOND, ARCHITECTS



General Exterior View



Typical Floor Plan

Oxford Apartments, St. Louis, Mo.
La Beaume & Klein, Architects

should only open to one kitchen on a floor, otherwise the danger of robbery increases. The delivery of food, ice, etc., and the taking away of garbage by the dumbwaiter, are most annoying; but the difficulty can be modified greatly by the manner in which the house is run and cared for by the janitor. Some of the older buildings had one common dumbwaiter in the hall for the use of all the tenants, but that now only occurs in the tenements.

The kitchen naturally should be convenient to the dining room, but otherwise shut off as much as possible from the balance of the apartment to keep out the noise of dishes and odors of cooking.

Ventilation, unfortunately, is little considered in most of the kitchens, which often results in every

one knowing what their neighbors are going to have for dinner. Two flues, 12 by 12 or 12 by 16, connecting to alternate kitchens, are a great help in overcoming this nuisance, especially if a hood is over the range. In this room there is a great chance to please the housekeeping wife by compactness and the convenient location of the range, sink, tubs, dresser, refrigerator, etc. Also details that may be introduced in the manner of combining the sinks, tubs and drain-board, a small broom closet in connection with the dresser, a drop table, sliding bread board and arrangement of the drawers and dressers, an overhead clothes dryer that lets down by pulleys, the concealed and ventilated garbage holder under the window, the garbage chutes connecting directly with the incinerator, shelves and utensil hooks—all tend to make a house a success. It is surprising how often an apparently minor detail, as any of those just mentioned, will attract the woman looking for an apartment and overbalance a major defect.

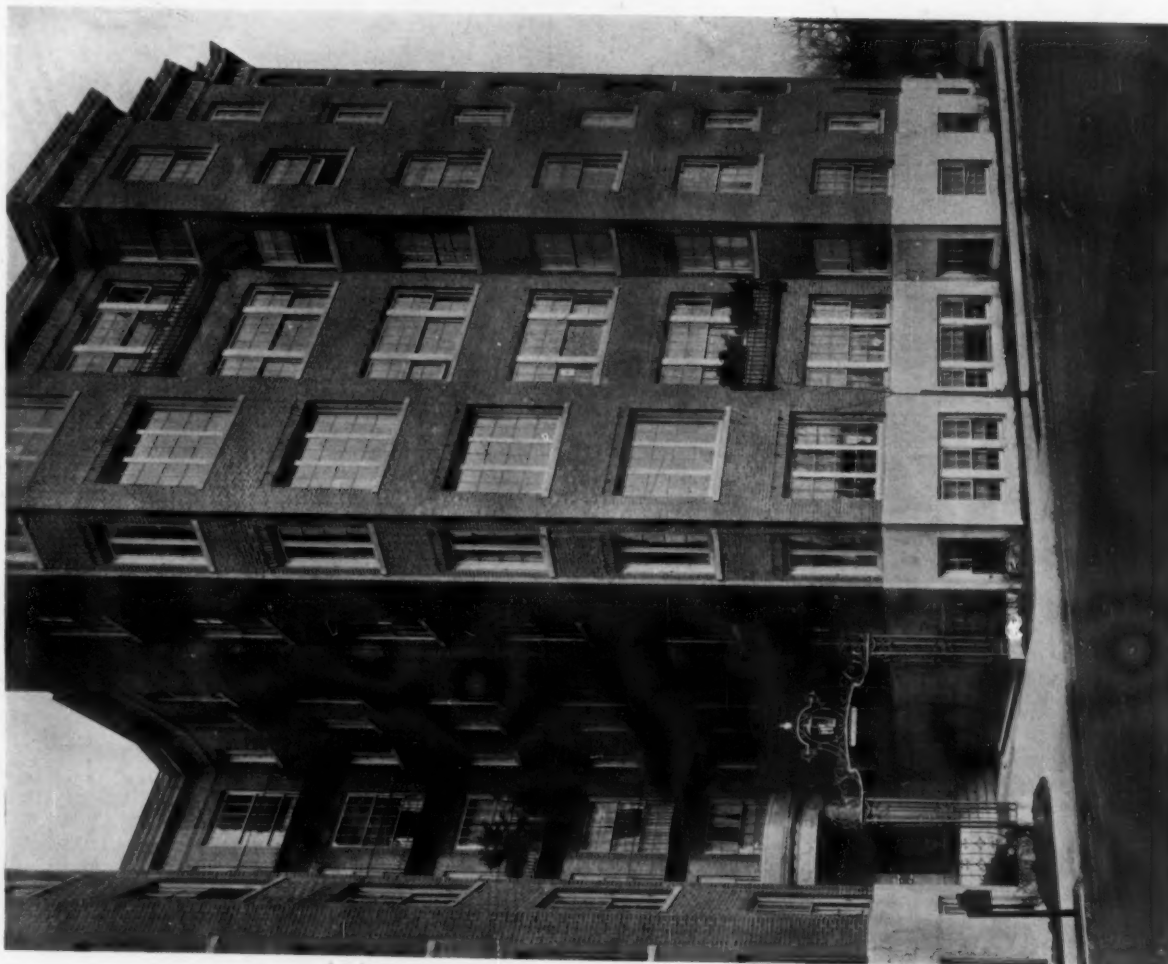
Whether the living room or chamber should have better exposure has raised many discussions. The argument for the living room is to have a cheerful room with good outlook in which to spend the day. The argument for the chamber is that the room to be slept in should have the sun if possible and the best ventilation, as during the day much of the time is spent in them, while the living room is used most during the evening. Apartments have been designed both ways with success. But probably the majority of the public give preference to the living room having the good exposure. The chamber should never be next the elevator for obvious reasons. It should have at least one ample closet. It is worth while to provide an additional closet in the apartment and to make use of space under window seats for closets.

Unfortunately few apartments make good use of the roofs. In that a splendid opportunity for a roof garden is lost. The objection of the builders to having it is the cost and a fear of their tenants



TYPICAL FLOOR PLAN

This building is provided with fireproof halls and stairs, each apartment having two fireproof means of exit. Apartments vary from two to six rooms, all of them containing a large living room with an open fire. The kitchens are conveniently arranged and are provided with service stairs direct to basement, where laundry space and maids' rooms are located.



CONCORD HALL APARTMENTS, CAMBRIDGE, MASS.
NEWHALL & BLEVINS, ARCHITECTS

becoming too friendly, gossiping and conniving and discussing the defects or apparent annoyances in the building, which, of course, appear magnified, and then following with concerted complaints to the owners. This may seem exaggerated, but there are instances of sun parlors being designed and built for apartments and then abandoned just because that happened. With most houses the only use made of the roof is for the drying of clothes. It is unfortunate, as with the crowded streets it would make an excellent place for children to play.

The laundry problem has never been settled. Probably the most practical method is the old custom of hanging from the clothes pole in the rear, but long discarded on account of appearances. The other methods—drying on the roof, using clothes dryers and a common laundry in the cellar—each have their advocates, and one is as successful as the other.

The basement differs greatly in different apartments, due a great deal to management. The controlling features are the boiler, the coal space and the access to the dumbwaiters. As many trades people have to have access to the last, they are semi-public, therefore they should be easily reached and the passage shut off from all other parts so there is no excuse or temptation for people to stray from the corridor.



Typical Floor Plan, Georgian Court, Cambridge, Mass.
Goodell & Root, Architects

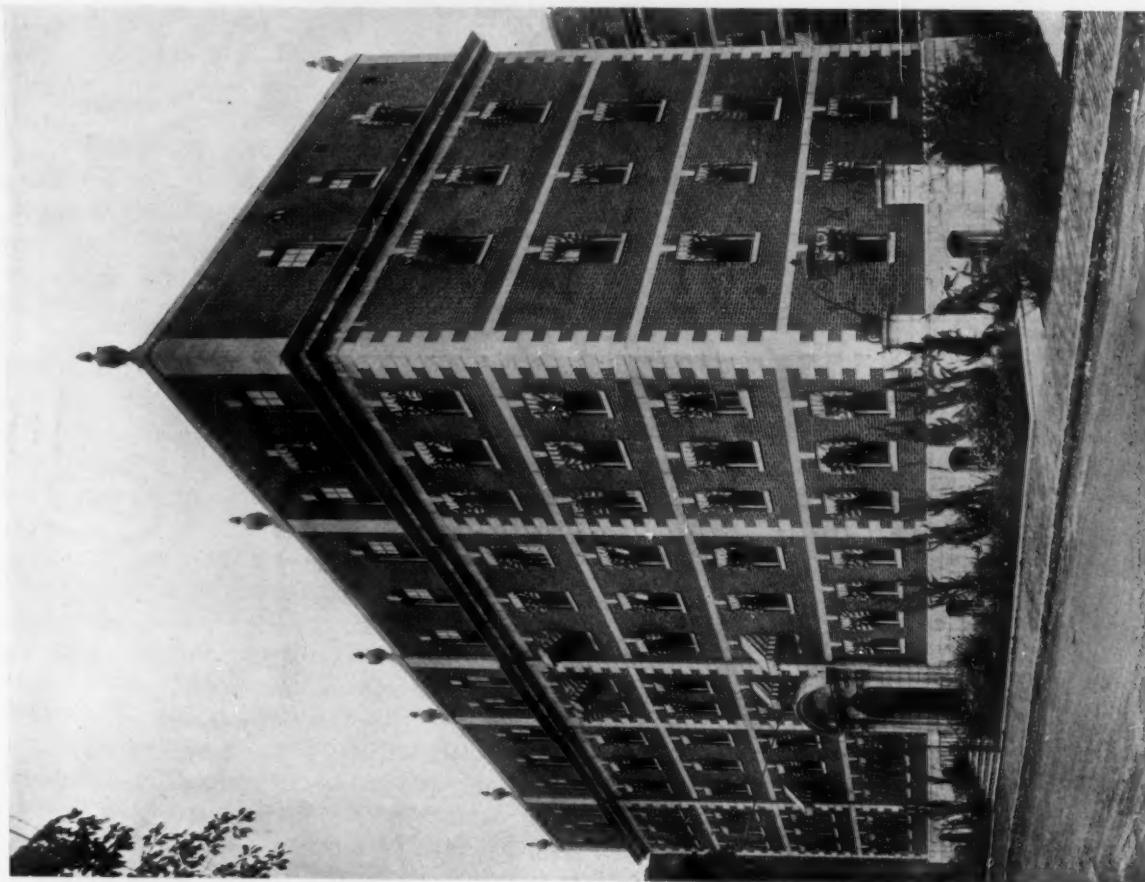
Too little care is given to the heating and water supply of buildings. Nothing causes more complaints and dissatisfaction than poor water supply, specially hot water, and lack of heat or noisy and leaky radiators. The generous use of cut-off valves will save much damage from leakage, and fire lines will save their cost many times in insurance premiums. Some thought to the convenience of the handling of the coal and firing the boiler will also show economies.

A few years ago the accommodations for the janitor were very meager, and very small salaries were paid, because the privilege was sought by many. But it has been found that it is a good investment to give the janitor good quarters and pay him enough to get good service, for he is the owner's representative, and his action reflects on the owner and can easily change the character of the house.

One of our difficult problems is the fire escape, — a decided necessity. No reputable architect would think for a moment of wishing to eliminate the second means of exit, yet all would welcome the elimination of the



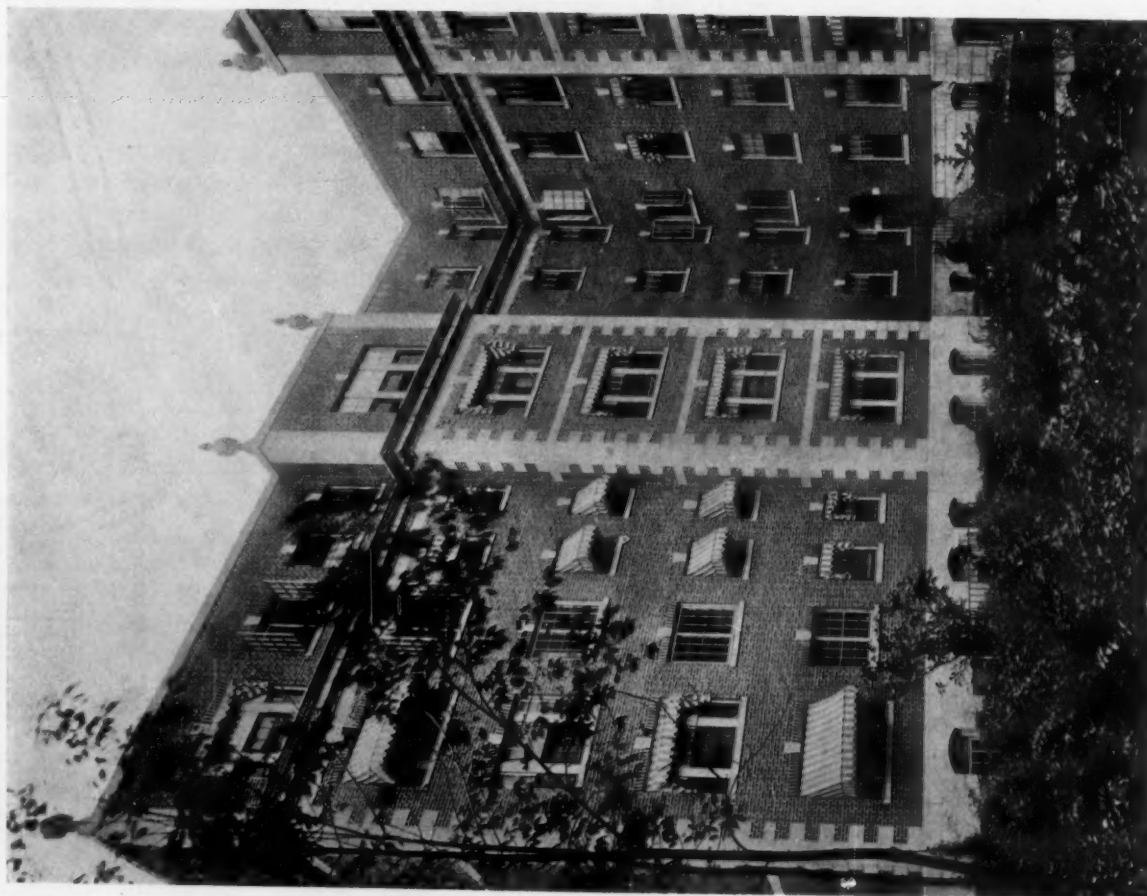
Detail of Entrance from Court, Georgian Court, Cambridge, Mass.



GENERAL VIEW OF STREET FACADE

GEORGIAN COURT APARTMENTS, CAMBRIDGE, MASS.

GOODELL & ROOT, ARCHITECTS



VIEW OF INTERIOR COURT

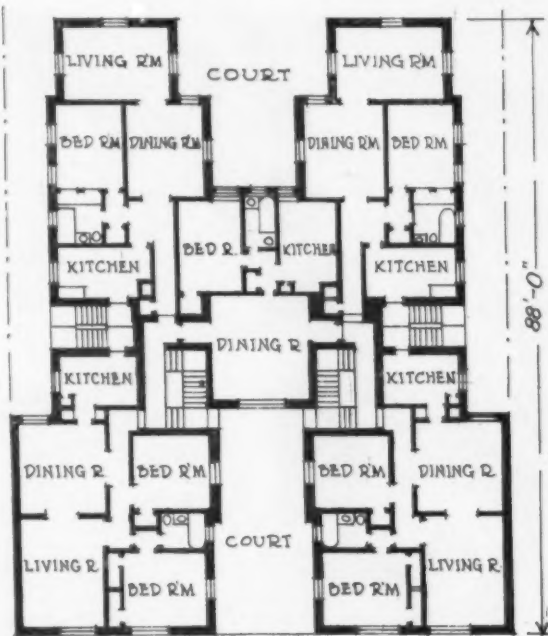
fire escape—they are dangerous—and the means of many accidents and robberies. In many of the cheaper houses they are used so much for litter of different kinds that the fire department has to make constant inspections to see that the regulations are not violated. With care in planning they can be omitted.

The plan illustrated opposite shows a second means of exit from each apartment—an exit that is far safer than a fire escape and that also provides for rear delivery service. The brick wall between the two staircases adequately cuts them off from each other. The cost of these two stairs is slightly more than the three fire escapes required; but consider the enhanced value of the building without the fire escapes on the façade, and this extra cost is more than balanced, especially on the front of a building where it is so objectionable that to many it immediately stamps an otherwise high class apartment as a second class apartment.

One point of the New York law demands that if an apartment faces on the front and not the rear, it must have the fire escapes on the front if no other second exit is provided.

It cannot even be on a side court opening to the street. Many variations have been tried, such as forming a recess for the fire escapes and even masking them with arches or fenestration of some sort, but they still form a scar to the façade.

The plan opposite by Mr. Thomas shows another innovation of combining the fire escapes into balconies. When this plan was first published it was criticized as wasting property, but when put to the test, as illustrated in the previous issue, it showed a cost per rental foot of \$6.50 and covered 66.2 per cent of the property—a saving of 41 cents per rental foot over a building covering 78 per cent of the property, or a saving



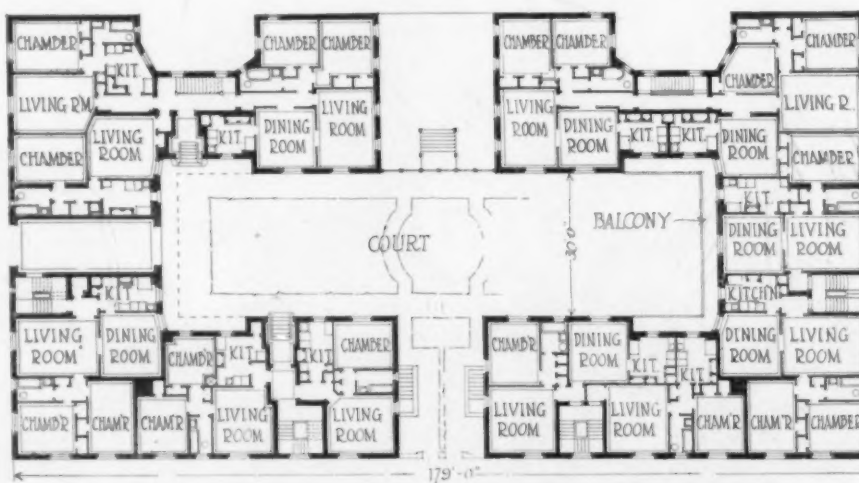
Apartment House Plan Showing Open Stairs between Fire Walls as Fire Escapes
Andrew J. Thomas, Architect

of 6 1/8 per cent over the total cost of the operation.

Several plans are published of buildings in Middle West cities. In these, special attention should be called to the extensive use of the sun parlor, sometimes taking the whole end of a room, or being added to the front and covering portions of the living room and dining room. They may also be used as open air chambers. Loggias placed on the corners of the buildings are also quite common in Washington.

The use of the combination kitchen and dining room is to be noted, sometimes called the "dining kitchen." It consists of a long narrow room, the inside being used for a kitchen and the outer part for the dining room. The division is formed by china closets 4 to 6 feet high. Another exceptional feature is the use of the folding wall bed, that swings into a ventilated closet, sometimes large enough to be used also as a dressing room.

The opportunities for new types of apartment buildings to meet the demands not only of investors, but to furnish the public with better living conditions, are innumerable, but require an endless amount of study. The details are so numerous that an article of this kind can only touch upon them. Yet it is to be hoped some assistance may be gained from these comments.



Plan of Apartments, 183rd Street and Concourse, Bronx, New York, Showing Fire Escapes Arranged as Balconies on the Court Walls

Andrew J. Thomas, Architect

ARCHITECTURAL & BUILDING ECONOMICS DEPARTMENT

C. STANLEY TAYLOR, *Associate Editor*

The Financing of Apartment House Projects

IT may be said generally that apartment building has during the past years been divided into two distinct classes: first, the purely speculative building activity; and second, the building of rental properties for permanent investment.

Naturally the first class of building has been poorly planned and cheaply constructed. The average speculative builder has had very little reason, in his own estimation, to call for the services of an architect. On the other hand, his problem was that of financing the building as extensively as possible without the use of his own money, and to build so cheaply and at such low overhead cost that a building could be made to show an attractive gross rental income when first tenanted in order that he could sell or exchange the building quickly with a good margin of profit to himself.

With the exception of isolated cases here and there where the speculative builder was in a position to carry out other than "shoestring" financing, and where he has been foresighted enough to realize that by building right an investing clientele would follow his operations and take the building off his hands at reasonable profit, we find that the trail of the speculative apartment house builder has almost invariably been one of inefficiently designed buildings in which material and equipment have been of inferior value and poor lasting quality.

On the other hand, practically all of the better apartment house buildings which can be found throughout the country are the result of investment building rather than speculative.

Such buildings have been little affected by fluctuations of the real estate market, and have maintained their values remarkably well even in periods when a comparatively small amount of property was being transferred.

In following the impress of mortgage foreclosures through apartment house sections of our various cities, it is evident that the owners of cheaper speculative buildings have invariably been the first to suffer financial reverses. In such buildings the turnover of tenants with consequent increased cost of repairs and general maintenance has always been much higher. Of course, at the present time, all apartment buildings are affording unusual incomes to their owners, and in the larger cities the speculative real estate activity has been almost confined to this class of buildings.

To-day, however, both speculative and investment builders are adopting a much better standard, owing to the fact that economy can be realized only through careful, practised design, and that buildings constructed at present-day costs must be built well if they are to maintain their values. What is more natural than that the great volume of expenditure which is now commencing in the field of apartment building shall be largely directed by the architectural profession? Here only can the planning experience so greatly desired by present-day builders be found, together with the ability to develop plans which will result in economies of building and maintenance.

Evidently, then, the architect is to be brought into consultation from the very inception of many such building projects. His advice will be asked in connection with the location of the building, and in many instances he will be called upon to interest himself in the financing of the project, which is probably the most difficult factor in connection with present-day apartment house building.

Preparing to Finance the Project

Never in the history of building finance has such careful study been given to the subject as the analytical consideration now applied by various loaning institutions to each logical mortgage loan application which is presented to them at the present time. These institutions are striving to do all that lies within their power to assist in remedying the housing shortage and to encourage building which will afford means of relief. Earnest endeavor is being made to encourage general public investment in mortgage securities, but at the same time it is necessary to afford such investors definite security. For this reason careful attention is paid to the planning and construction of the building to make certain that it is designed with efficiency of purpose and constructed sufficiently well to create an investment and collateral unit which will not suffer when building costs may be lower.

At this point the services of a capable architect may add materially to the success of the project in preparing carefully for its presentation to the loaning institution or other source of mortgage money. In order to obtain from the loaning source a definite idea of what proportion of the financing may be obtained under a building and first mortgage loan, the first application should be accompanied by

carefully presented sketch plans showing the floor plans and elevations of the building; outline specifications showing the proposed construction of the building, and a general rental and maintenance cost schedule to demonstrate the earning power of the building. These figures should be based on actual conditions applying to the building in question. The estimated cost of the building accompanying the plans should be more than tentative and based if possible on relative costs of similar construction in the same locality at a recent period and tempered by any change in the building material and labor market. In other words, the plans should be worked out efficiently to meet a known demand in the locality, and all cost and income figures should be made with sufficient accuracy to make certain that they will be borne out by careful investigation.

Many architects have at present well established reputations with loaning institutions in the building field, and for others who have not done so much work in this field there is offered an opportunity now to establish good will and a name for careful, intelligent work which will prove of considerable business value in the years to come.

Various Methods of Financing

There are, of course, in common with most types of investment and speculative business activities, many methods of financing apartment house projects. In general, however, these may be broadly classified along the following lines.

The financing methods more commonly and successfully used for apartment building projects are:

1. Building without mortgage.
2. Building and permanent first mortgage and equity.
3. First and second mortgage and equity.
4. Participation mortgage and equity.
5. First, second and third mortgage and equity.
6. Amortization first mortgage and equity.
7. Co-operative financing.

The above methods of financing are considered in brief paragraphs following, and numbered to correspond with the tabulation:

1. The building of apartment houses without mortgage needs little comment, as such an activity is unusual and only possible where considerable funds are at the disposal of the builder. There are, of course, few apartment houses which are constructed and kept without mortgage, as the earning capacity of money which is borrowed at $4\frac{1}{2}$ to 5 per cent is usually sufficiently great to show a profit above that figure.

On the other hand, the building of apartment houses without building loan, for the purpose of placing the mortgage after the house is completed,

is a method which is quite often followed. In this manner some saving may be enjoyed through elimination of the cost of financing, and in many instances it is possible to obtain a more favorable mortgage loan after the building is completed.

In some cases building loans are made for the carrying out of apartment house projects. These may be straight building loans or building and permanent loans. In the case of the straight building loan an amount of money equal approximately to a normal first mortgage is loaned in three or four payments as the building progresses, and payment is provided for within one year after the completion of the building. In this manner a large proportion of the building cost is financed, and during the year after completion sufficient time is provided in which to arrange for a first mortgage loan.

Some builders and building companies which are particularly well financed build apartment houses on a speculative basis and sell at somewhat more than the average market price by taking back a first mortgage, which is more liberal than that usually allowed by the average loan institution. In this manner it is found possible to add somewhat to the selling price of the building and in turn to discount the first mortgage, which in itself constitutes a method of financing not unusual in localities where mortgage money is somewhat difficult to obtain.

2. A usual method of financing an apartment house project is through the medium of what is known as a building and permanent mortgage. In this manner, after working drawings are completed, a definite mortgage contract is entered into with a loaning institution, the provisions of which form a definite agreement as to the amount of first mortgage to be placed on the property after the building is finished. In the interim, to finance the construction, a building loan is made in three or four payments, the first payment usually after excavation and foundation is completed; the second payment when exterior walls are up and roofing on; a third in some cases when the rough plaster coat is finished; and the final instalment at the completion of the building. This final instalment is made when completing the last payments on contracts or building cost, in whatever form it may take, and shortly thereafter the agreed amount of first mortgage loan is adjusted and recorded.

The usual cost of a building loan is about 10 per cent for one year and 6 per cent for a period which the owner may extend over that time. It is evident, however, that in obtaining a building loan the bonus system must operate in direct ratio with the difficulty of financing and the amount of money available for such projects in a given locality. In

times when there is little money in the building loan market, bonuses varying by agreement between the principals are paid for obtaining a building loan, and the amount of bonuses which the owner can afford to pay depends largely on the demand for the building and the consequent rental or sales profits which may be anticipated.

Permanent first mortgages are usually placed on a basis of $4\frac{1}{2}$ to 6 per cent interest for a period of from three to five years. In placing a mortgage loan there are certain costs which must be met, including at times a bonus, although an extensive bonus is not usual in this case. Where the loan is placed through an attorney or mortgage broker there is a fee varying from $\frac{1}{2}$ to 2 per cent of the principal amount, and in addition to that the mortgagor is expected to pay the cost of recording, legal services, title insurance policy or abstract, and other fees incidental to a real estate transaction of this nature.

In general it may be assumed that the cost of obtaining a first mortgage will be from 2 to $3\frac{1}{2}$ per cent of the principal amount. The actual rates of interest on first mortgages are controlled in many instances by state law, but usually mortgage interest is as shown in preceding figures.

At the time a mortgage becomes due it is customary to seek an extension of the mortgage, at which time from $\frac{1}{2}$ to 1 per cent of the principal amount is paid as a cost. In many states also there is a mortgage tax, the amount of which is easily determinable on inquiry and which is paid on all new mortgages as issued. This amount must also usually be borne by the borrower, but in case of renewals or replacement of mortgage it is customary to transfer the mortgage in a manner which will make it unnecessary to pay a mortgage tax on that particular property again.

After the completion of the building on this plan of financing further procedure depends on the purpose of the building. If it is a speculative venture, the building is immediately placed on the market subject to first mortgage and whatever terms are agreeable to the owner. If an investment project, the operation is now complete and a first mortgage loan, usually approximating from 50 to 60 per cent of the value of land and building, has been arranged.

In this manner the equity represents the investment of the owner, and on this amount the percentage of his rental profits is figured.

3. It can be readily understood that an apartment building operation, financed on a first mortgage only, requires a considerable cash investment by the builder, which represents usually from 40 to 50 per cent of the entire cost of land and building. The average speculative builder is not usually in

a position to invest so heavily in a single operation and for that reason it is quite customary to borrow on notes during the progress of the building operation an amount of money approximating 10 to 20 per cent of the cost of the operation, with the understanding that when the building is completed and first mortgage placed, a second mortgage is to be issued to take up these notes.

In general, second mortgage money is expensive in that a discount which in some cases is as high as 15 per cent is asked by professional lenders in this market. Often, however, where the builder finds it necessary to finance in this manner, this discount or bonus is paid and added to the cost of the building on which to base its selling price.

Another method by which the building operation may be financed through the medium of a second mortgage is to arrange for the owner of the land to take a substantial price for his property, but in lieu of cash to take this entire amount as a second mortgage on the building when completed on this land. This action is commonly known as going behind the first mortgage and constitutes a method which is rather commonly employed by speculative builders. The land owner receives a good price for his property and is at all times protected by his mortgage claim. He in turn often discounts this mortgage if he wishes to cash in on his property.

Second mortgages are placed on buildings quite usually in the form of purchase money mortgages. This operation entails the construction of a building subject to a first mortgage, and at the time the owner sells the property he takes from 15 to 25 per cent of the sales price in cash and allows the balance of the equity to be paid for in the form of a second mortgage placed on the building and owned by him. This mortgage may be kept as an investment or discounted, and in many cases represents the actual profit on a building operation, while the cash payment is a return to the building owner of his original investment.

4. A form of mortgage which has been used somewhat extensively in the East and some parts of the West and South is known as a participation mortgage and involves the placing of a more than ordinarily liberal first mortgage in the following manner:

From any loaning institution a normal first mortgage representing from 50 to 60 per cent of the value of the property is obtained, and from individual investors an additional amount of approximately 10 per cent, or sometimes as high as 15 per cent, is also obtained under the same mortgage. In this proceeding a participation mortgage is issued, having a face value or principal of 70 to 75 per cent of the value of land and building. The

first loaning institution has a primary interest in 60 per cent of this mortgage, and the lender of the participation money has the balance of interest. In this manner one interest rate applies to the entire mortgage and the actual interest payments are divided *pro rata* according to ownership of the mortgage.

The reason for placing such a mortgage is often to avoid the legal complications and sometimes the excessive cost of a second mortgage, or in some cases to make it possible to obtain a more liberal first mortgage through the services of any institution legally restricted to a loan not exceeding a certain percentage of the building, but through whose services investors may be reached who are willing to take the additional risk.

A participation mortgage in one sense is better than the first and second mortgage in that all necessary legal action in filing and other necessary procedure may be carried on under direct co-operation. From the lender's point of view the second claim in a participation mortgage is somewhat better than a direct second mortgage, as some relief is thereby given against action which might be taken by the first mortgagee where foreclosure proceedings are instituted.

5. In apartment building operations of a highly speculative nature in which the principal purpose is to carry out as great a volume of building as possible on a slender capital, the operation is in many cases financed through the media of first, second and third mortgages. Naturally in obtaining third mortgage money, while the rate of interest is usually 6 per cent, as in the case of the second mortgage, the actual cost of financing this proportion of the operation is excessive, as money thus invested entails considerable risk on the part of the lender. The third mortgagee must assume all responsibility of the owner in respect to the first and second mortgages, and must make any payments on which the owner may default.

All mortgages on this class of property, as in fact practically all real estate mortgages, contain provisions by which foreclosure proceedings may be undertaken in case the owner defaults on normal payments, such as taxes, assessments and interest. Under foreclosure proceedings action may be brought by the first mortgagee and the property sold at auction to pay for the principal amount on this mortgage. In case of foreclosure sale, the second and following mortgagees must be ready to pay off the first mortgage, replace it, and to buy in the property or bid it up to an amount sufficient to protect the principal of the mortgage.

In foreclosure proceedings where the property is actually bid in at foreclosure sale by an outside party, the first mortgagee has the prior claim

after taxes are paid, and second and third mortgages are paid off after the first has been satisfied.

6. To meet the unusual conditions of present-day building in which high building costs must be met, it is evident that many of the more conservative sources of building loans are not willing to loan even as high as 60 per cent of the cost of the operation. This condition is the result of present-day high costs, and the refusal to make liberal loans is due to fear that some time in the future replacement values may decrease to the direct injury of the value of collateral on which the loan is based. To meet this condition, however, a number of loaning institutions, particularly those financed by investors in real estate mortgage bond companies, are specializing in the amortization form of loan. The amortization mortgage generally takes two forms, the first being a loan of a longer term than usual with a liberal principal amount, sometimes up to 70 to 75 per cent of the cost of land and building. The amortization plan calls for a periodical reduction of the mortgage principal by annual payments. For instance, a loan may be made of 70 per cent of the cost of land and building, and the loan period may be ten or fifteen years. Annual payments include not only interest but part of the principal, which will repay the entire amount over the term of years.

Another form of amortization loan calls for a liberal mortgage principal and for comparatively small annual payments on principal over a term of five years, during which this principal is reduced to a normal first mortgage loan. The cost of a loan of this type depends largely on the loaning institution from which the money is obtained; but as a rule the borrower pays the general costs of the transaction together with 1 per cent of the principal amount as a fee or profit to the loaning institution.

7. Another interesting and somewhat novel method of financing apartment house operations is involved in the so-called co-operative method. Basically this method involves the bearing of the financial burden by a number of persons, each of whom participates in the profits which may accrue. There are a number of co-operative methods which have been evolved. One of these which has been successful entails the actual ownership of an individual apartment unit in the building. In other words, the apartment instead of being rented is purchased outright, and the rental actually paid is known as the owner's rental, and is a *pro rata* division of the running cost of the building. In such an operation the building may be constructed without mortgage and on funds advanced by the individual apartment purchaser, or the purchase may represent a share in the equity of the building.

This co-operative method involves considerable detail and has in effect developed a new science of building protection.

Co-operative apartment buildings which have been successful have, as a rule, not been entirely sold to individual apartment buyers. Usually about 40 per cent of the rentable space in the building has been placed at the disposal of shareholders; while the balance of 60 per cent of rentable space has been leased in the usual manner, the profit on such occupancy being applied to the reduction of rental of occupying stockholders in the venture. This type of operation has, in one or two successful instances in New York City, resulted in investments paying an average return of 15 per cent.

Another interesting co-operative method of financing an apartment building project has been that of interesting various sub-contractors. Several buildings have been constructed on this basis in the East, involving ownership by carpenter, plumber, mason, electrician and other sub-contracting units, in ratio to the amount of service and labor furnished, while actual material purchase has been carried out through building loan and first mortgage financing.

It is evident that under the general classification of co-operative financing almost any equitable arrangement may be made in the course of which various activities called in for the erection of the building may take an actual interest in the completed structure, rather than cash for work performed or services rendered. In some cases the architect or contractor takes payment in the form of a second mortgage or a stock interest in the holding company.

Sources of Building Loans and First Mortgage Money

Practically all building loan and first mortgage money is obtained from the following sources:

1. Savings banks.
2. Title and trust companies.
3. Insurance companies.
4. Mortgage corporations.
5. Estates and private investors.

The method of obtaining mortgages is either the direct method of applying to a logical institution or individual for the loan, or through the services of a mortgage broker or attorney.

1. Savings banks are restricted by law to make real estate loans not exceeding 60 per cent of the appraised value of the land and building, or 40 per cent on vacant property. The savings bank, while conservative in making loans on apartment house property, is an excellent institution with which to do business, as a savings bank loan is not

usually called at its period of expiration, but as a rule such institutions are particularly liberal in making extensions. In this manner the cost of replacing a mortgage after a comparatively few years is avoided.

As a rule the savings bank mortgage has direct value in establishing the soundness of the property as an investment, and it is noticeable that apartment houses subject to mortgages from savings banks or other reliable institutions are more readily salable than those on which the first mortgage loan is placed with comparatively unknown individuals or organizations.

Savings banks as a rule adopt very definite policies as to the type of property on which they will loan and the locality in which they are willing to invest money. It is not difficult to learn which savings banks are interested and willing to loan on apartment house property, and by making direct application the owner is often successful in obtaining the required mortgage.

2. Title and trust companies loan extensively on apartment house property and may be directly approached by the owner. The procedure here is practically similar to that of obtaining a savings bank loan, but in some cases it is possible to obtain a more liberal interpretation of values and consequently a larger loan.

Generally title and trust companies maintain an Investors' Department through which bonds having as collateral real estate mortgages are sold and the principal and interest guaranteed. In this manner the money of many small investors is centralized, and to these investors $4\frac{1}{2}$ and 5 per cent is paid on money which is in turn loaned to building owners at 5, $5\frac{1}{2}$ and 6 per cent, the difference in percentages accruing to the company, which guarantees the individual investor's money and interest.

3. Insurance companies, particularly the larger fire and life companies, have extensive reserve funds, a large proportion of which is directed into the channel of building and permanent mortgages. Here again the approach may be direct and the amount of loan will be determined by excellence of plans and feasibility of the project.

4. For the purpose of directing extensive funds which represent many small investors in the real estate mortgage field, there have gradually developed a number of mortgage corporations which have this activity as their sole object. These mortgage companies sell guaranteed bonds having mortgages on real estate as collateral, and depend for their profit on charges made in connection with loaning of such money.

As reserve funds of such organizations are built up, it is apparent that at the discretion of corpora-

tion officials liberal loans may be made, and it is through such activities that the amortization and similar forms of mortgage are usually issued. These mortgage companies are sufficiently sound in their business methods, and in connection with the housing shortage are contributing in a valuable manner to direct the accumulation of small investors toward the financing of new housing and the consequent relief of housing shortage.

The example of the Liberty Loans and Government thrift activities has induced an increased saving tendency on the part of the American people, and this increased interest in sound investment is now being reflected by a constantly growing aggregate amount of capital available from small investors for loans on building projects, particularly those involving general housing and increased capacity of mercantile buildings.

In the larger cities, and particularly on the part of owners inexperienced in the placing of mortgages, it is quite customary to retain the services of an attorney or a mortgage broker to assist in the financing of apartment house projects. Many real estate brokers are also mortgage brokers, and some individuals and companies specialize in the mortgage business alone. Their business is to keep constantly in touch with sources of mortgage money and to know what class of property and what type of loan various institutions and individuals are willing to entertain.

With mortgage brokers commission ranges from $\frac{1}{2}$ to 2 per cent of the principal, commission depending on locality, difficulty of obtaining the money and general practice.

In applying through a mortgage broker for an apartment house loan it is not wise to retain the services of more than one broker at one time. When an apartment house project is contemplated and loan desired, the news quickly travels and several brokers may appear upon the scene anxious to do business for the owner. If the owner treats with all, the result is a flood of applications sent to various loaning institutions and accompanied by such statements as the individual broker may desire to make. As a result the property in question is often discredited, and obstacles are placed in the way of obtaining a loan in the proper manner. It is always safer to deal with an established mortgage broker who knows his business thoroughly, and when he asks for an exclusive authorization to obtain a loan, this should be given without question, as he will then feel free to expend his best efforts in consummating the transaction.

In the case of obtaining loans through attorneys, the procedure is simple. Many attorneys have at their disposal funds of estates or clients which are

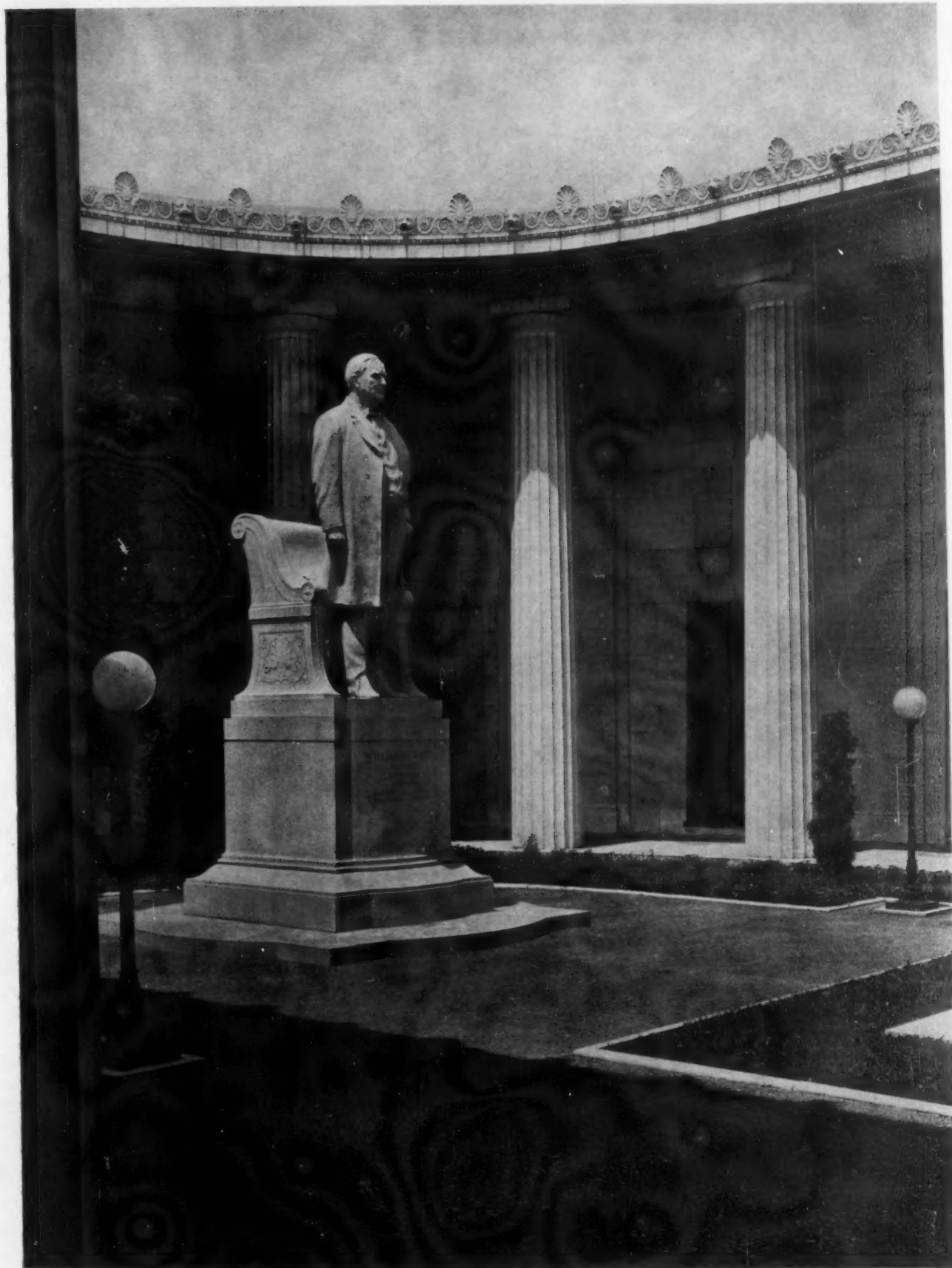
available for building investment in the form of building and permanent loans. Good apartment house loans are desirable for this class of investor, and it will often be found that the owner's attorney will be in a position to arrange his mortgage.

In obtaining additional financing such as second mortgage money, this also is often done through an attorney or mortgage broker. In fact, unless one has personal connections to obtain such money the attorney or broker is probably the best method through which to solve the problem.

There are, of course, all sorts and conditions of second mortgage lenders, among them being the popularly known "second mortgage shark." It must be realized that while a second mortgage is usually placed for the same period as the first mortgage, it is not always easy to obtain an extension of this mortgage or to replace it. Usually payment is called for promptly on the expiration date, and one phase of the business of the so-called second mortgage shark is to place a second mortgage loan and ultimately force an owner into foreclosure proceedings or other financial difficulties where he has operated on too slender a margin of capital.

The safest manner in which an apartment house project can be financed is through the medium of the building loan and permanent first mortgage, whether this be of the amortization type or of the usual type. The second mortgage in a sound procedure should make its appearance only as purchase money when the owner sells to the ultimate buyer, and financing on the so-called "shoestring" method which involves first, second and third mortgage loans and very little actual cash investment is at best questionable and somewhat dangerous to all concerned.

In estimating during the first consideration of an apartment house project, after carefully figuring the cost of the proposed building and the land, it is safe to assume that about 70 per cent of the entire operation can be financed through mortgage channels, while the balance of 30 per cent must represent investment by the owner. This actual investment amount, together with necessary funds for carrying on the business, usually represents individual investment or the investment of a corporation formed for the purpose of speculative and investment building. Where a company is formed for the purpose of building one or more apartment houses it is usually capitalized for about one-half of the total cost of the proposed building activity and at least 30 per cent of the stock sold, and cash placed in the treasury before operations are commenced. The balance of stock may then be retained as treasury stock or sold when additional financing is required.



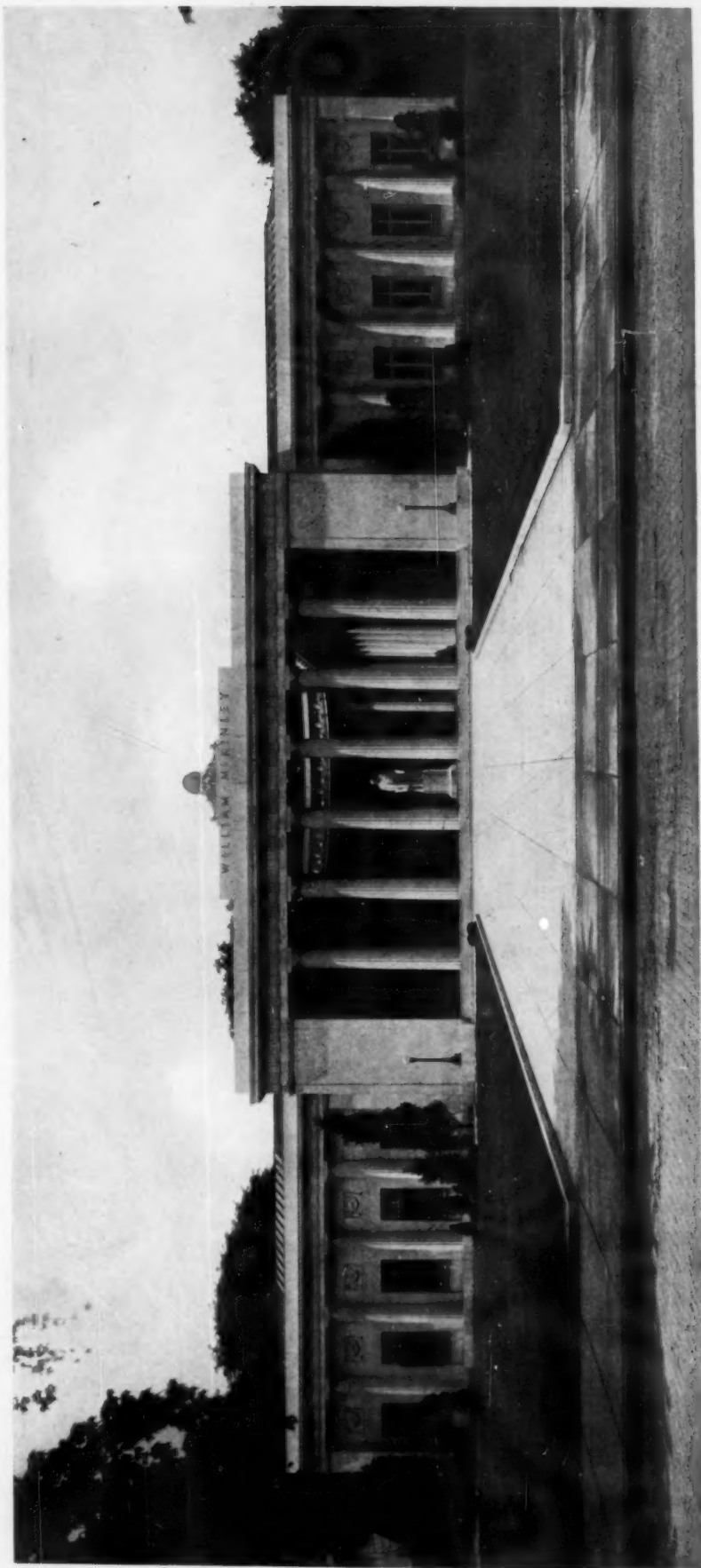
VIEW IN CENTRAL COURT

WILLIAM McKINLEY MEMORIAL, NILES, OHIO

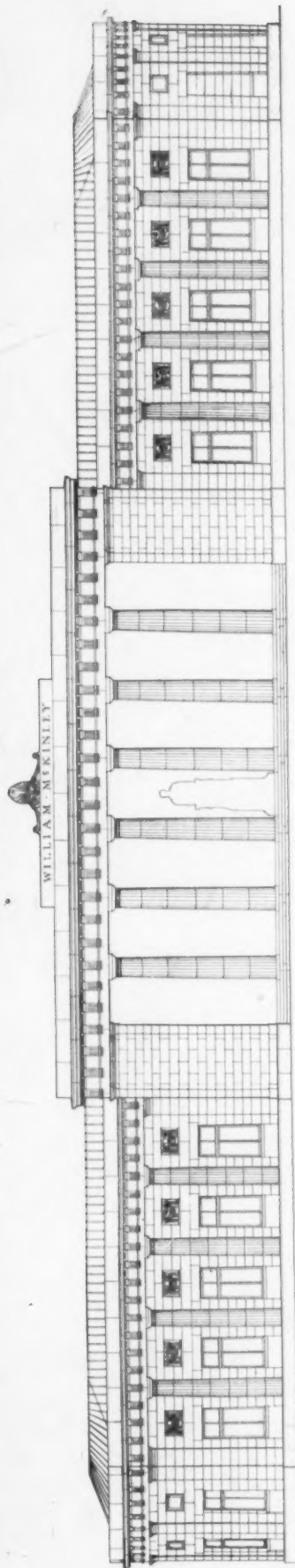
McKIM, MEAD & WHITE, ARCHITECTS

MASSY RHIND, SCULPTOR

40



GENERAL VIEW FROM STREET



ELEVATION OF MAIN FACADE

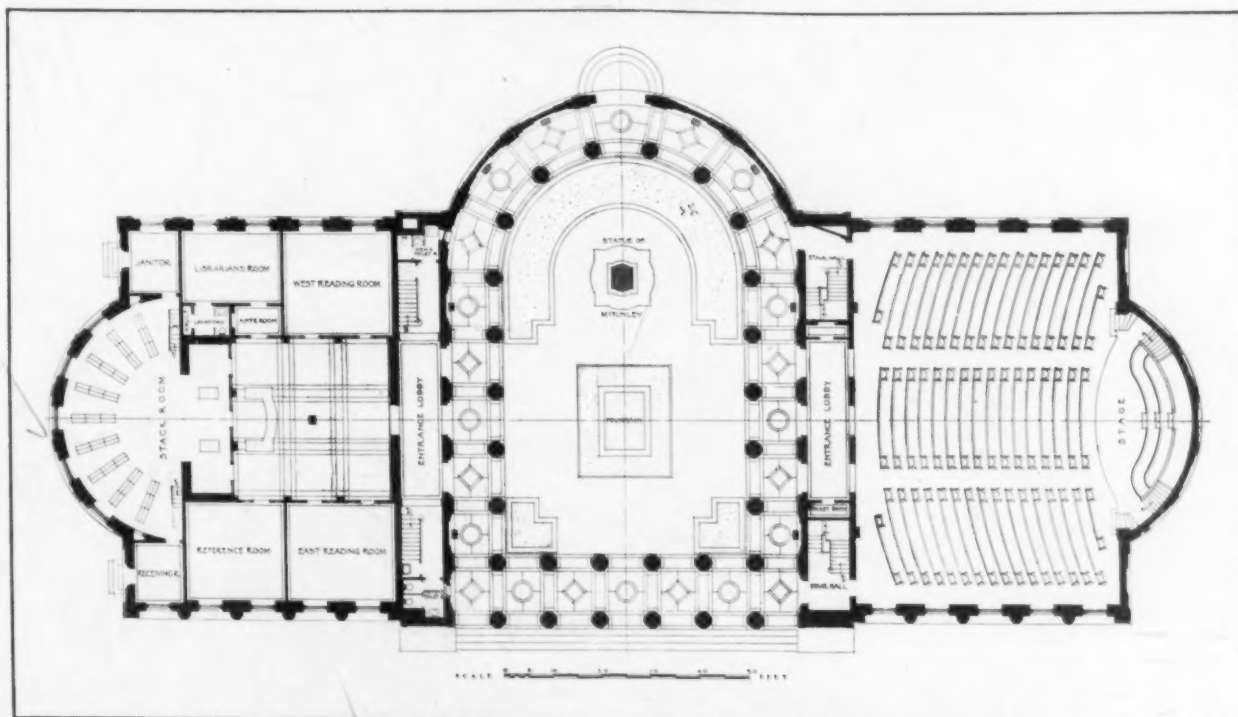
WILLIAM MCKINLEY MEMORIAL, NILES, OHIO
MCKIM, MEAD & WHITE, ARCHITECTS
MASSY RHIND, SCULPTOR



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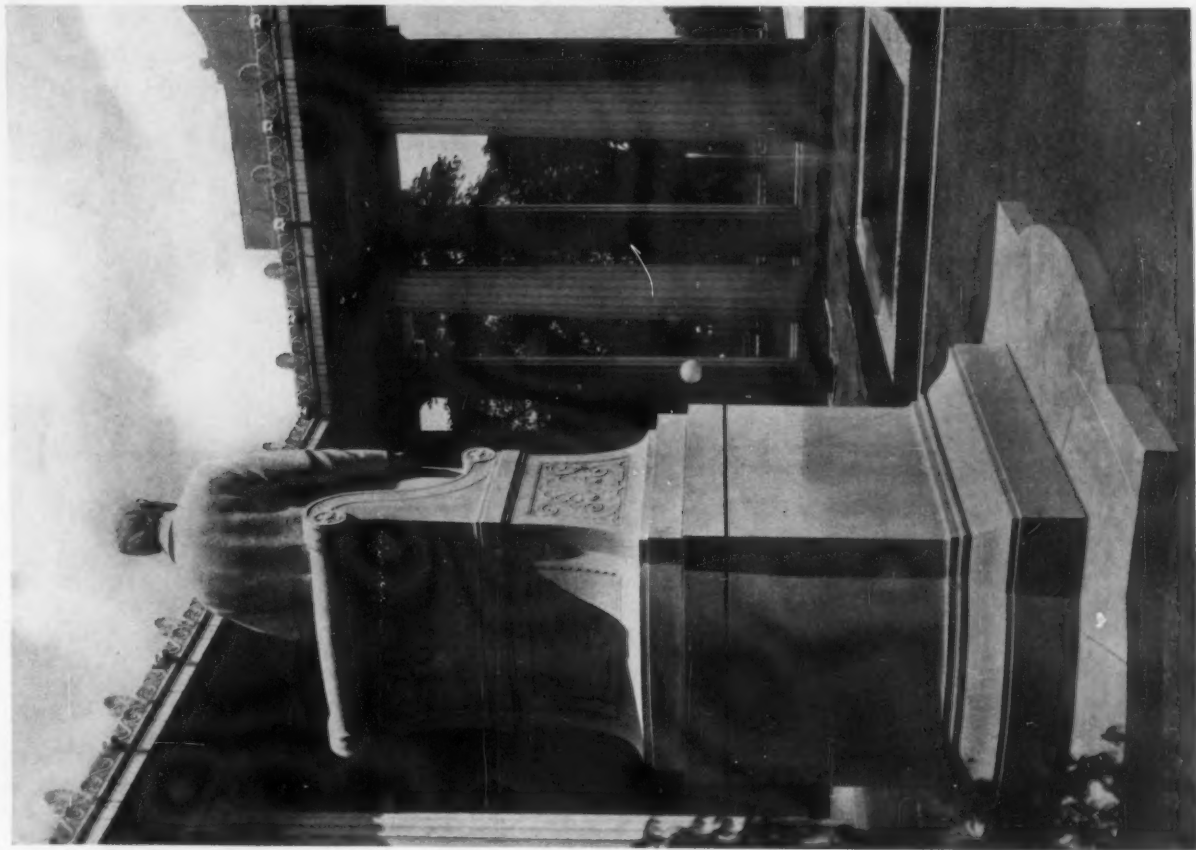
DETAIL OF COLONNADE



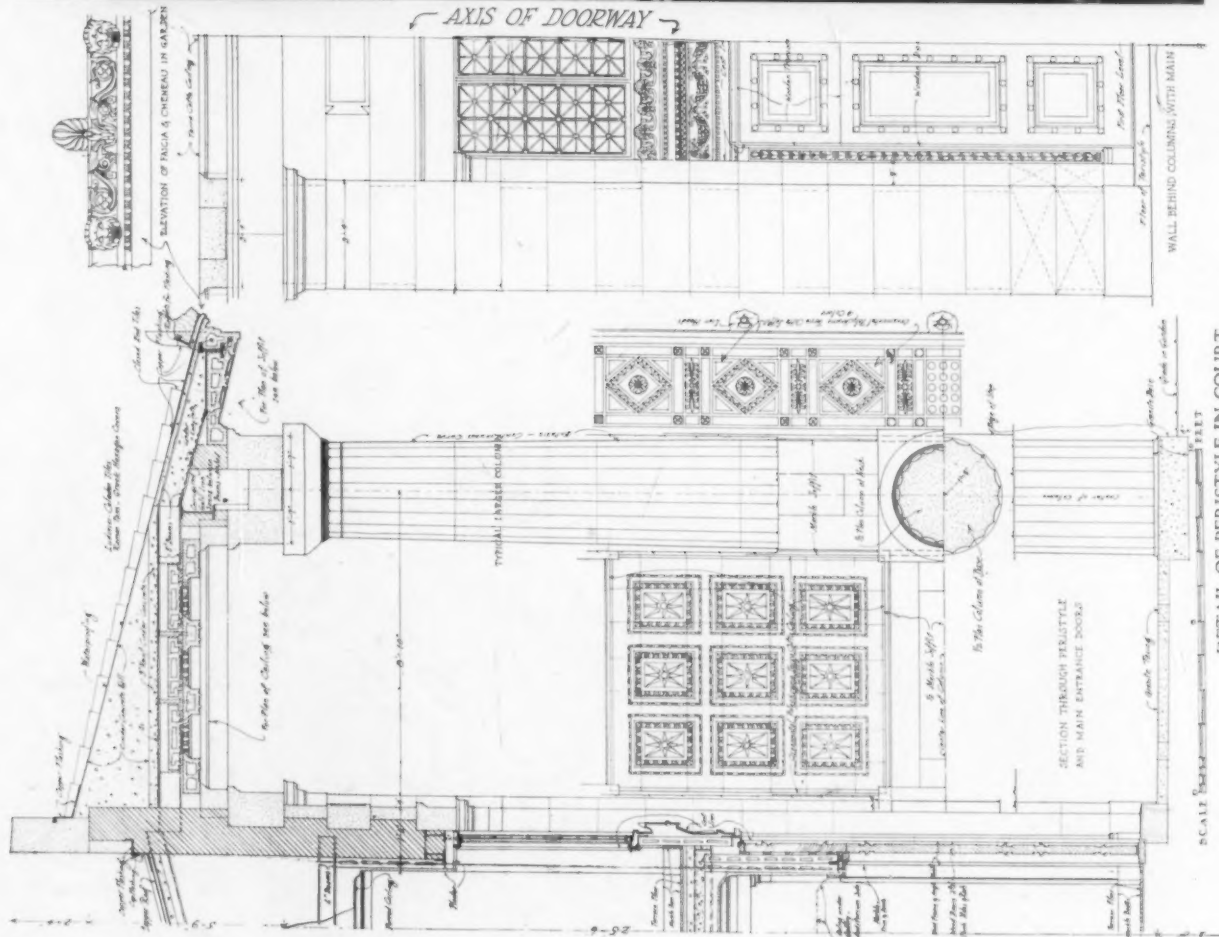
PLAN OF LIBRARY, COURT AND AUDITORIUM
WILLIAM MCKINLEY MEMORIAL, NILES, OHIO

McKIM, MEAD & WHITE, ARCHITECTS
MASSY RHIND, SCULPTOR

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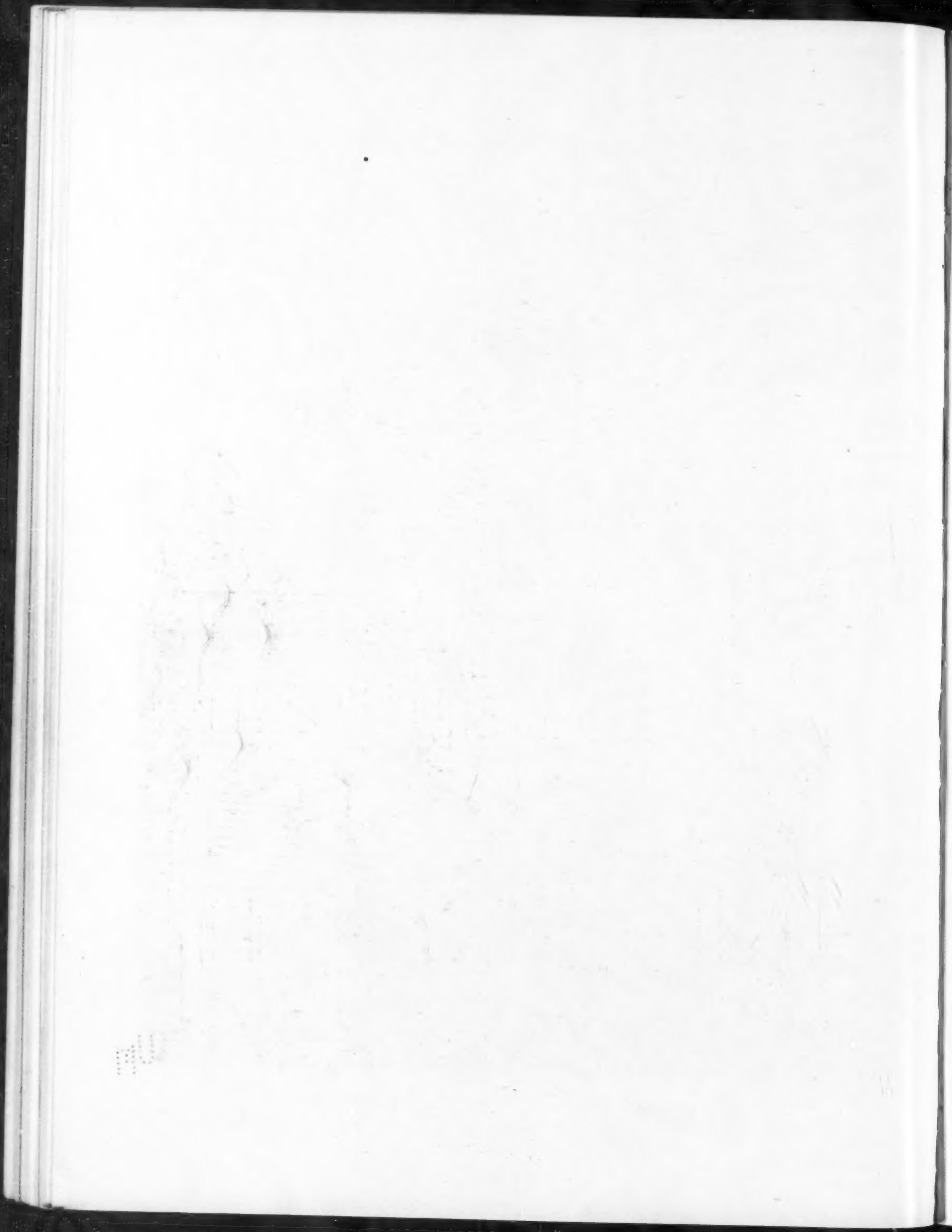


COLONNADE FROM CENTRAL COURT



DETAIL OF PERISTYLE IN COURT

WILLIAM MCKINLEY MEMORIAL, NILES, OHIO
MCKIM, MEAD & WHITE, ARCHITECTS
MASSY RHIND, SCULPTOR





DETAIL OF TOWER

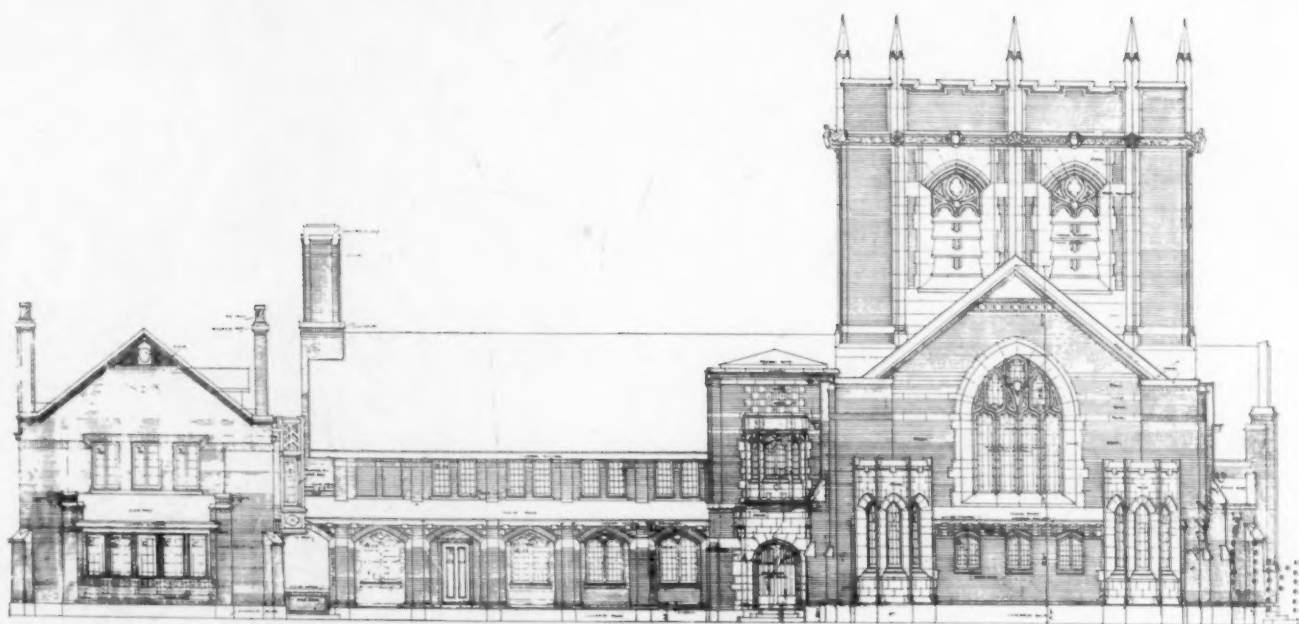
CHAPIN MEMORIAL PRESBYTERIAN CHURCH, NILES, MICH.

TALLMADGE & WATSON, ARCHITECTS

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VIEW FROM STREET



WEST ELEVATION

CHAPIN MEMORIAL PRESBYTERIAN CHURCH, NILES, MICH
TALLMADGE & WATSON, ARCHITECTS

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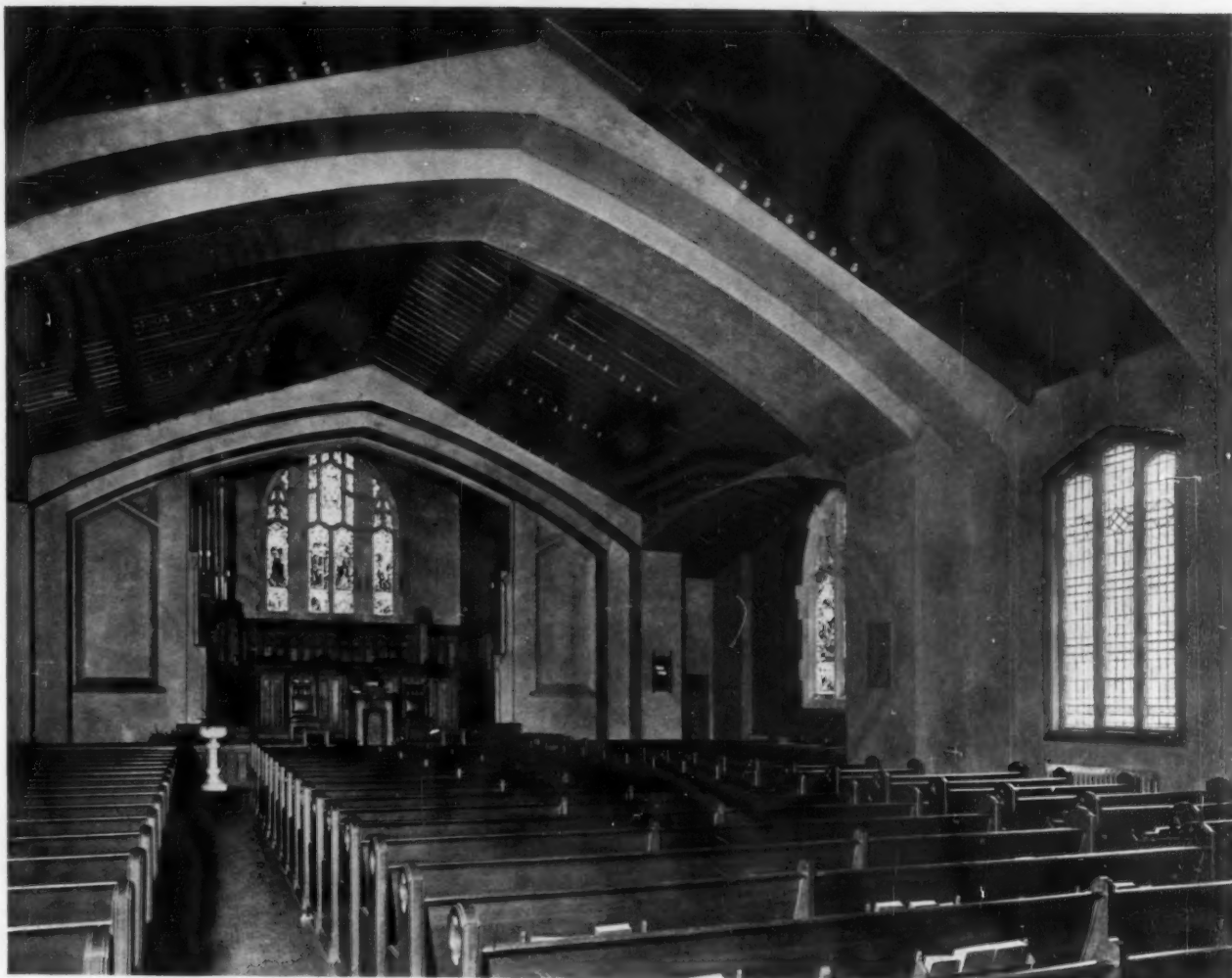
RECTORY FROM STREET



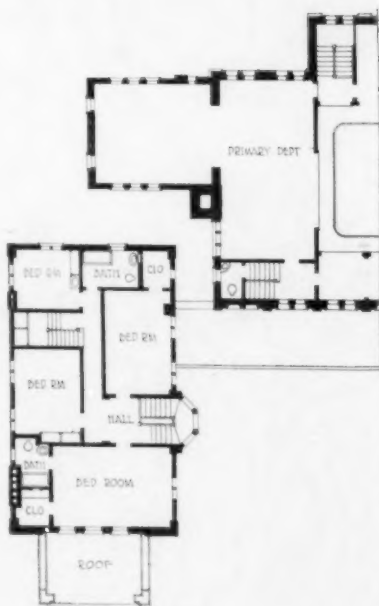
GENERAL VIEW

CHAPIN MEMORIAL PRESBYTERIAN CHURCH, NILES, MICH
TALLMADGE & WATSON, ARCHITECTS

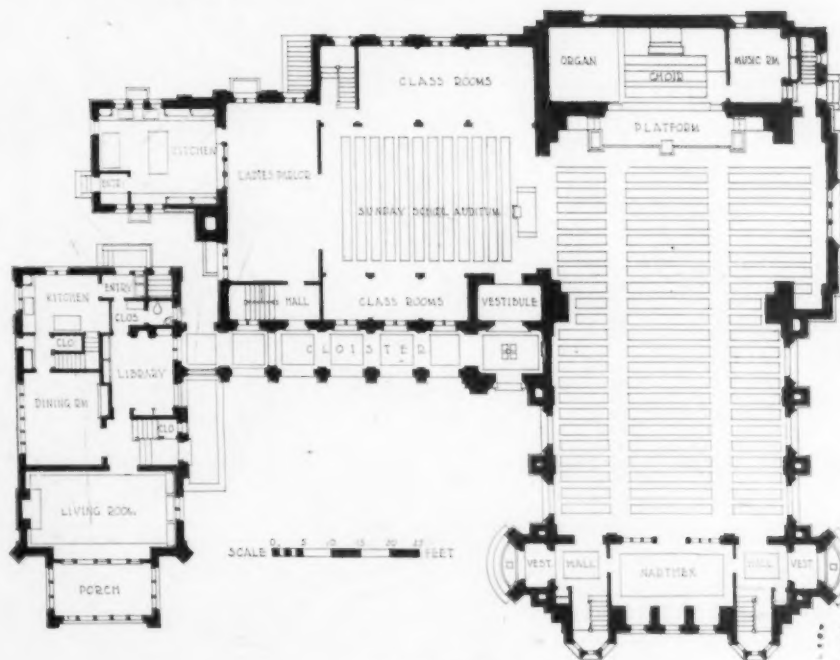
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VIEW OF NAVE



PART SECOND FLOOR PLAN



FIRST FLOOR PLAN

CHAPIN MEMORIAL PRESBYTERIAN CHURCH, NILES, MICH
TALLMADGE & WATSON, ARCHITECTS





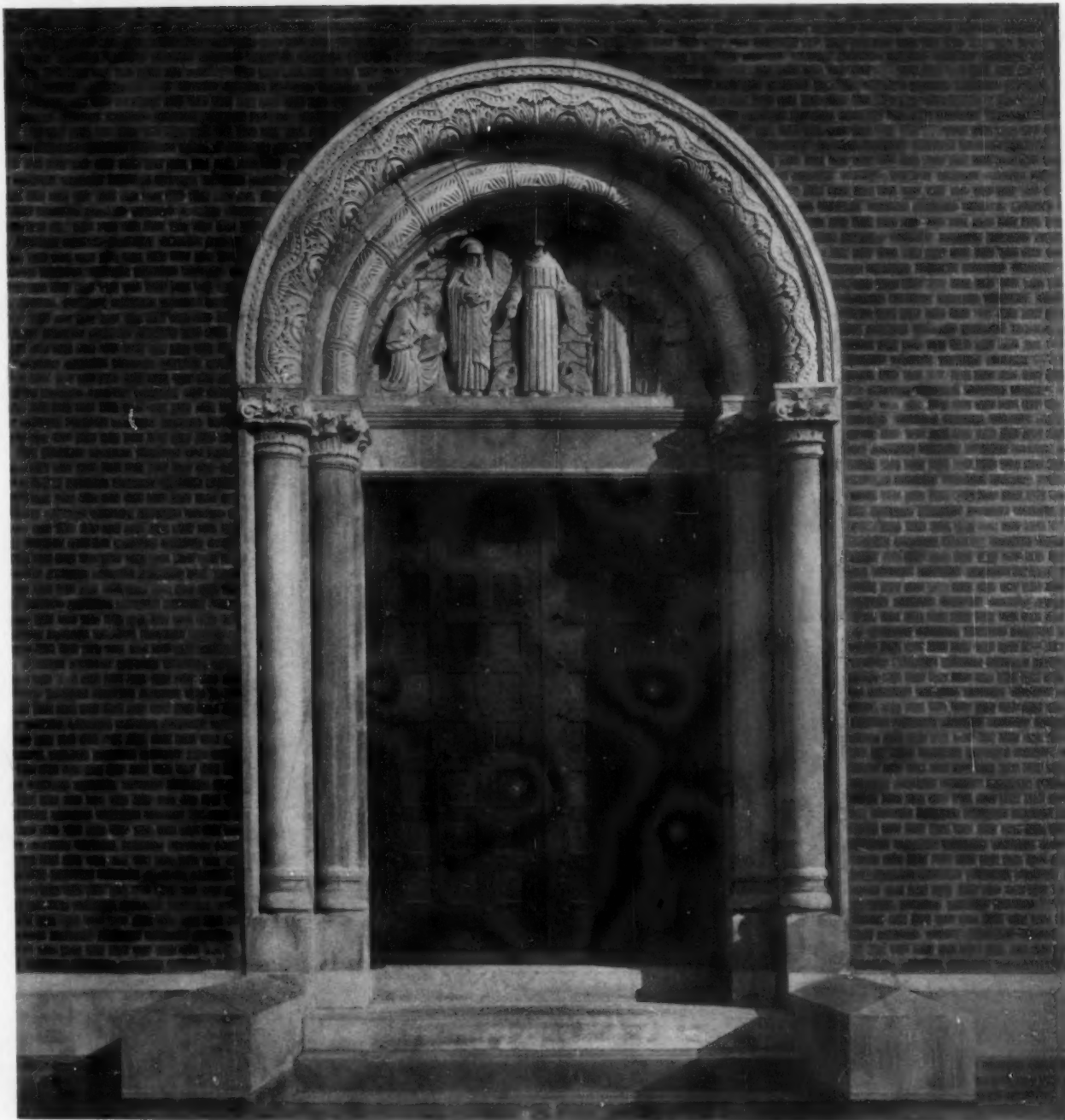
ENTRANCE FRONT



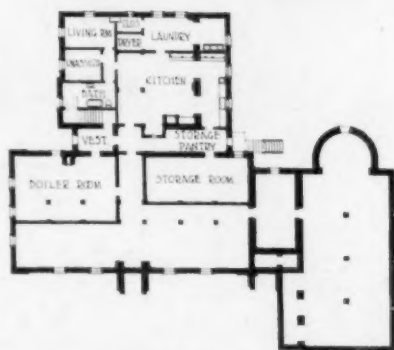
VIEW FROM REAR

✓ CAPUCHIN COLLEGE, WASHINGTON, D. C.
JOHN E. KAUZOR & BROTHER, ARCHITECTS

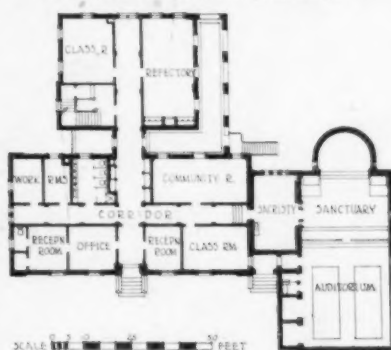
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DETAIL OF MAIN ENTRANCE



BASEMENT FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

CAPUCHIN COLLEGE, WASHINGTON, D. C.

JOHN E. KAUFOR & BROTHER, ARCHITECTS

FRANCIS ARETZ, SCULPTOR

20



VIEW OF TERRACE SIDES.
HOUSE OF MORRIS ROSENWALD, ESQ., CHICAGO, ILL.
HOWARD SHAW, ARCHITECT

20



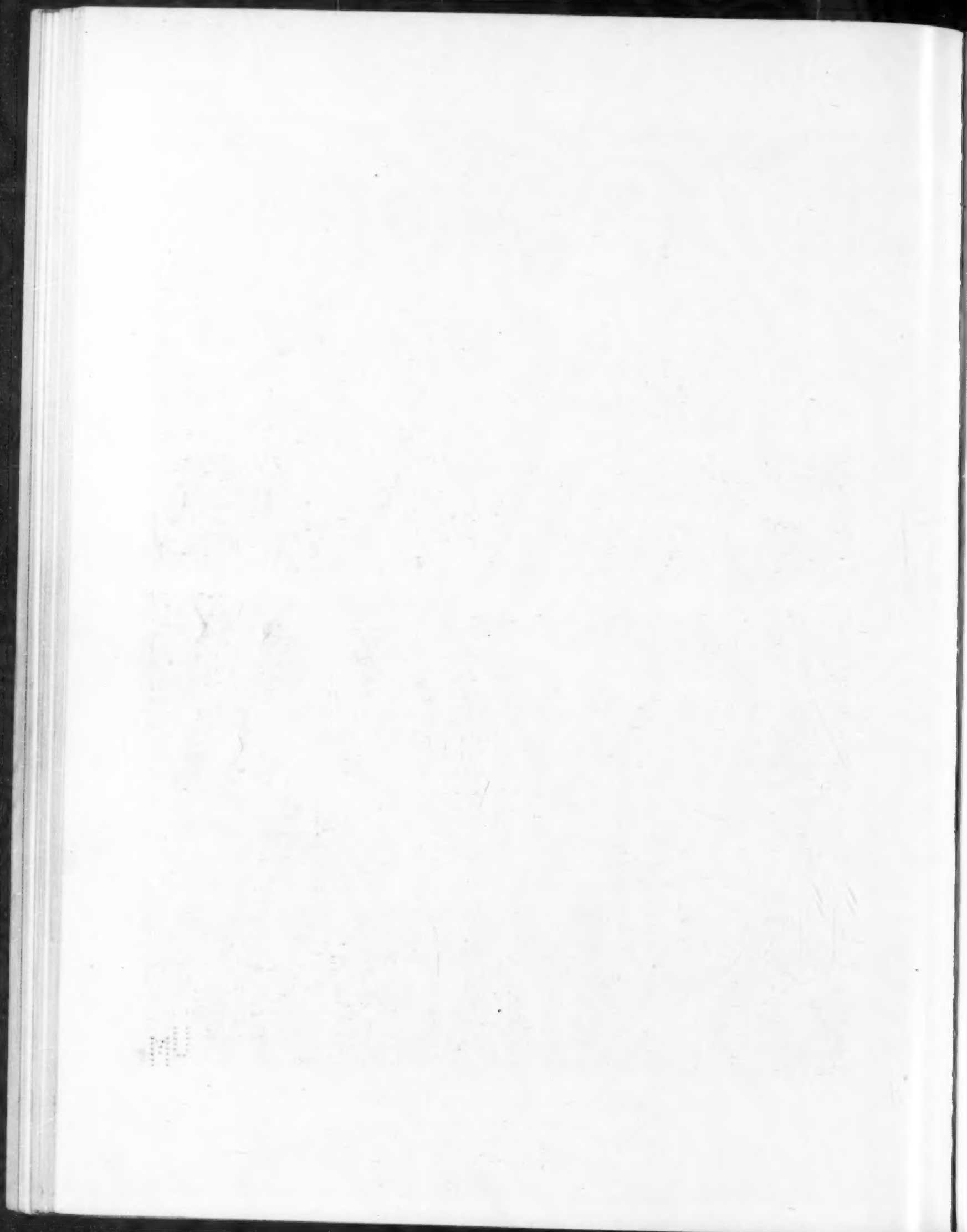
VIEW OF ENTRANCE SIDE

0 10 20 30 40
SCALE OF FEET



HOUSE OF MORRIS ROSENWALD, ESQ., CHICAGO, ILL.

HOWARD SHAW, ARCHITECT





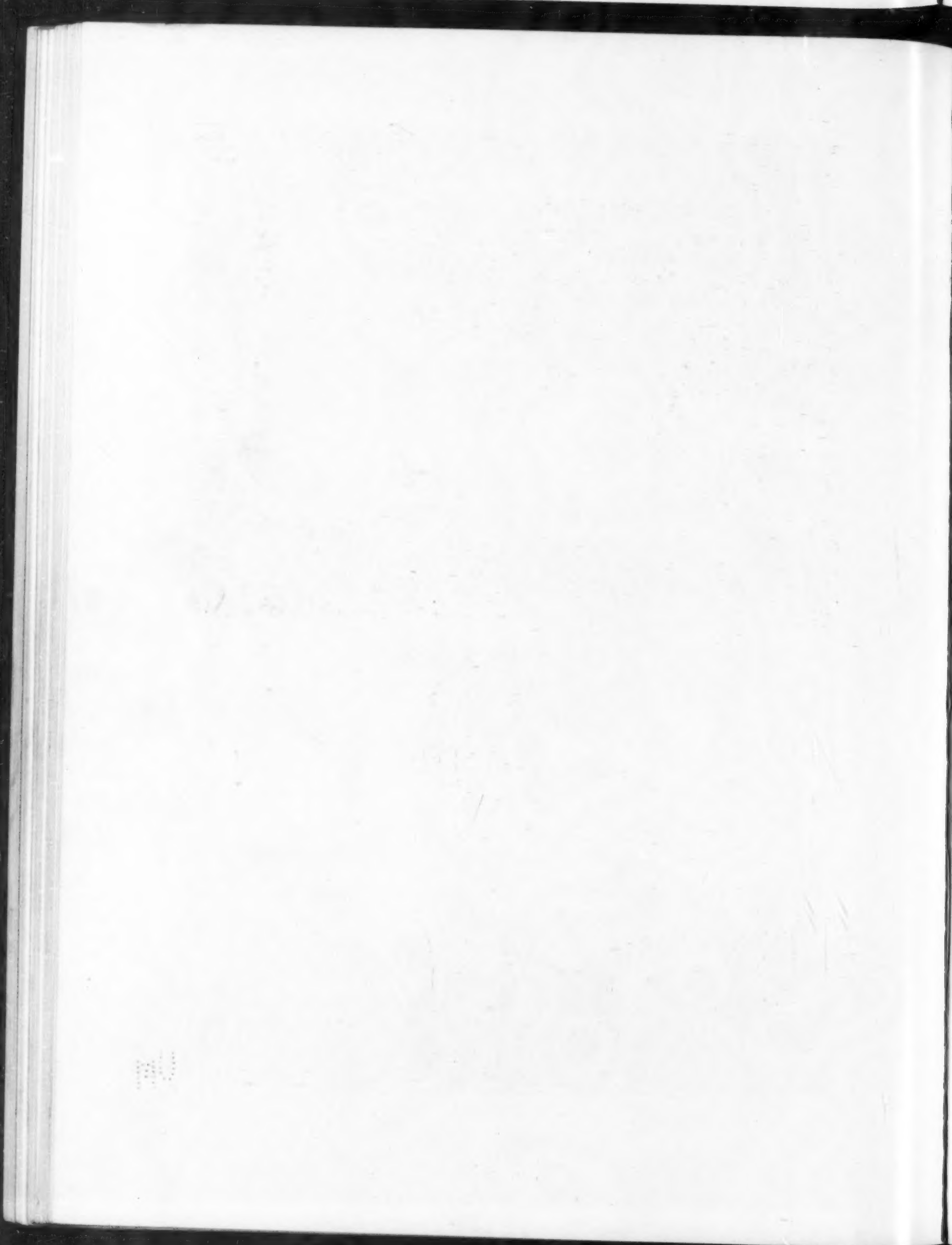
ENTRANCE HALL

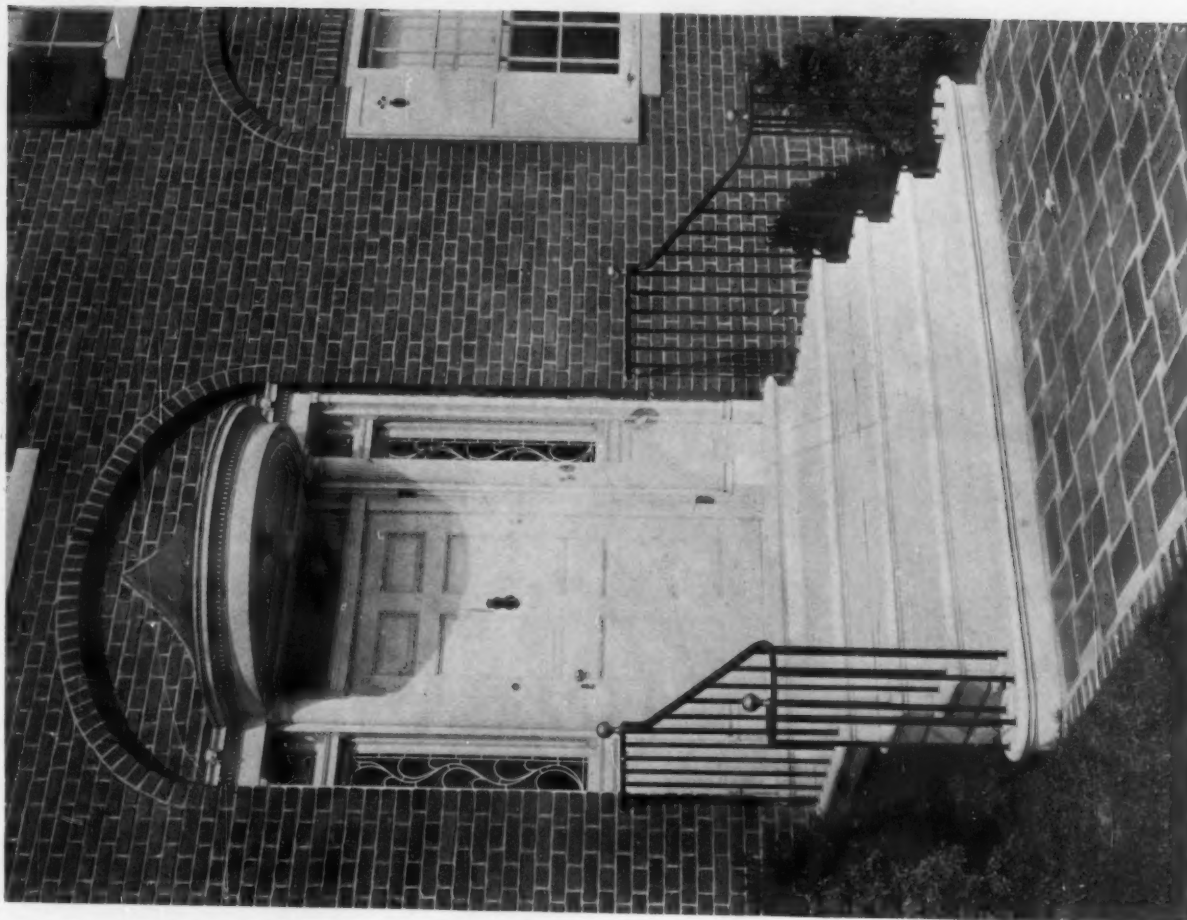


SECOND FLOOR HALL

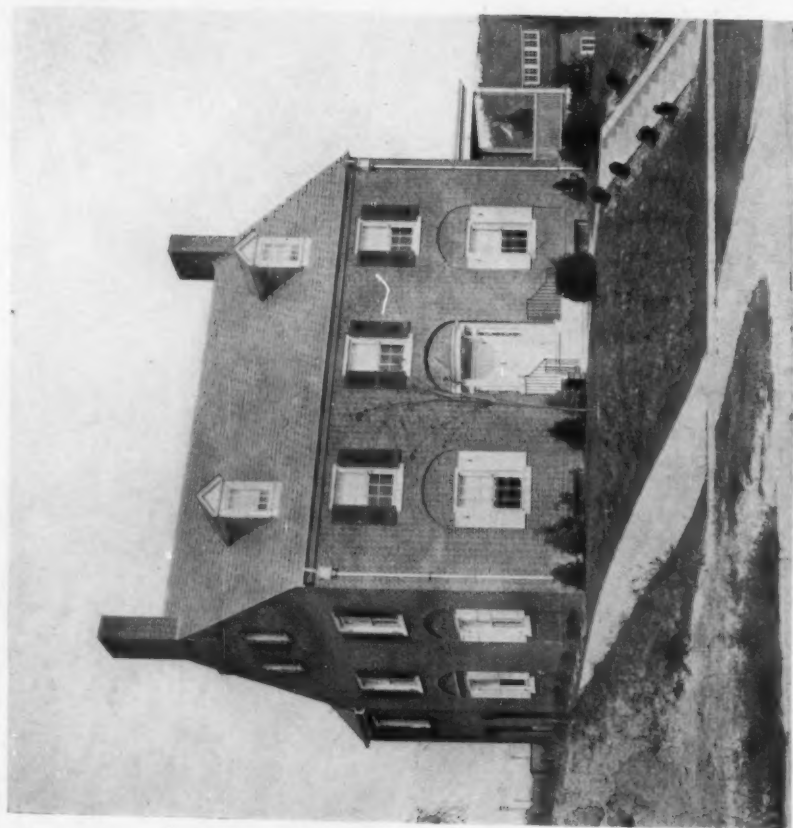
HOUSE OF MORRIS ROSENWALD, ESQ., CHICAGO, ILL.

HOWARD SHAW, ARCHITECT

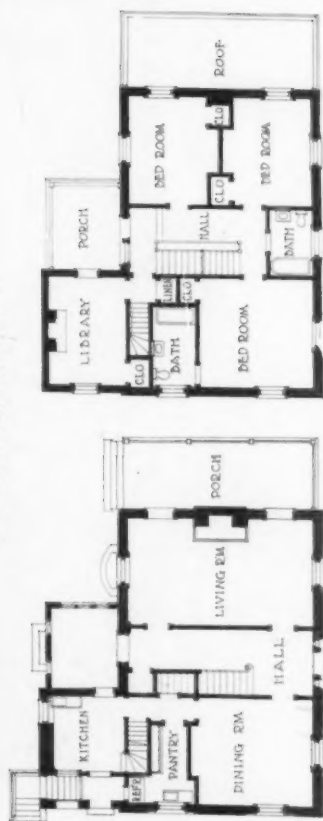




DETAIL OF DOORWAY



GENERAL VIEW OF HOUSE



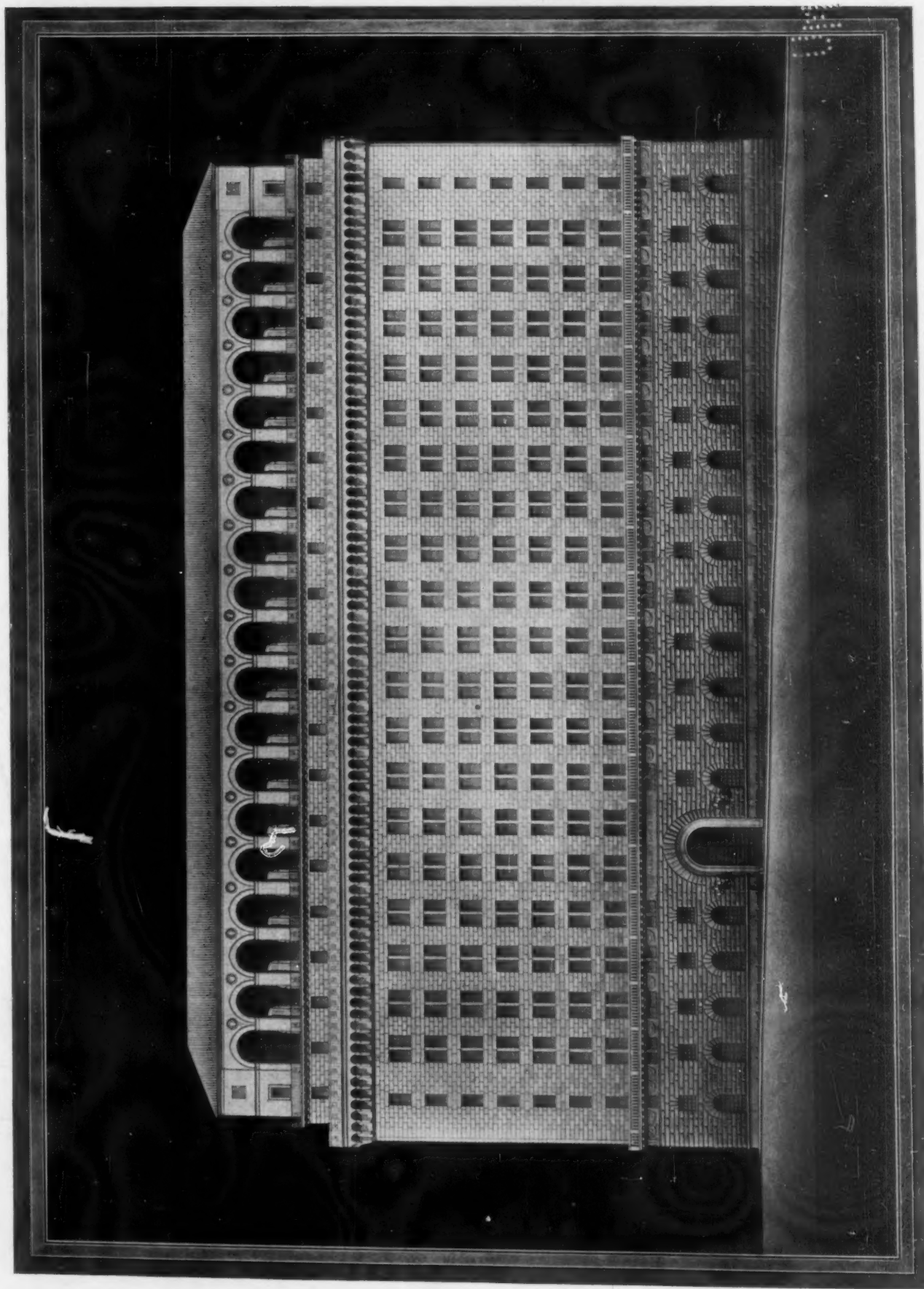
SECOND FLOOR PLAN

FIRST FLOOR PLAN

HOUSE OF THEODORE A. STEINMULLER, ESQ., BALTIMORE, MD.

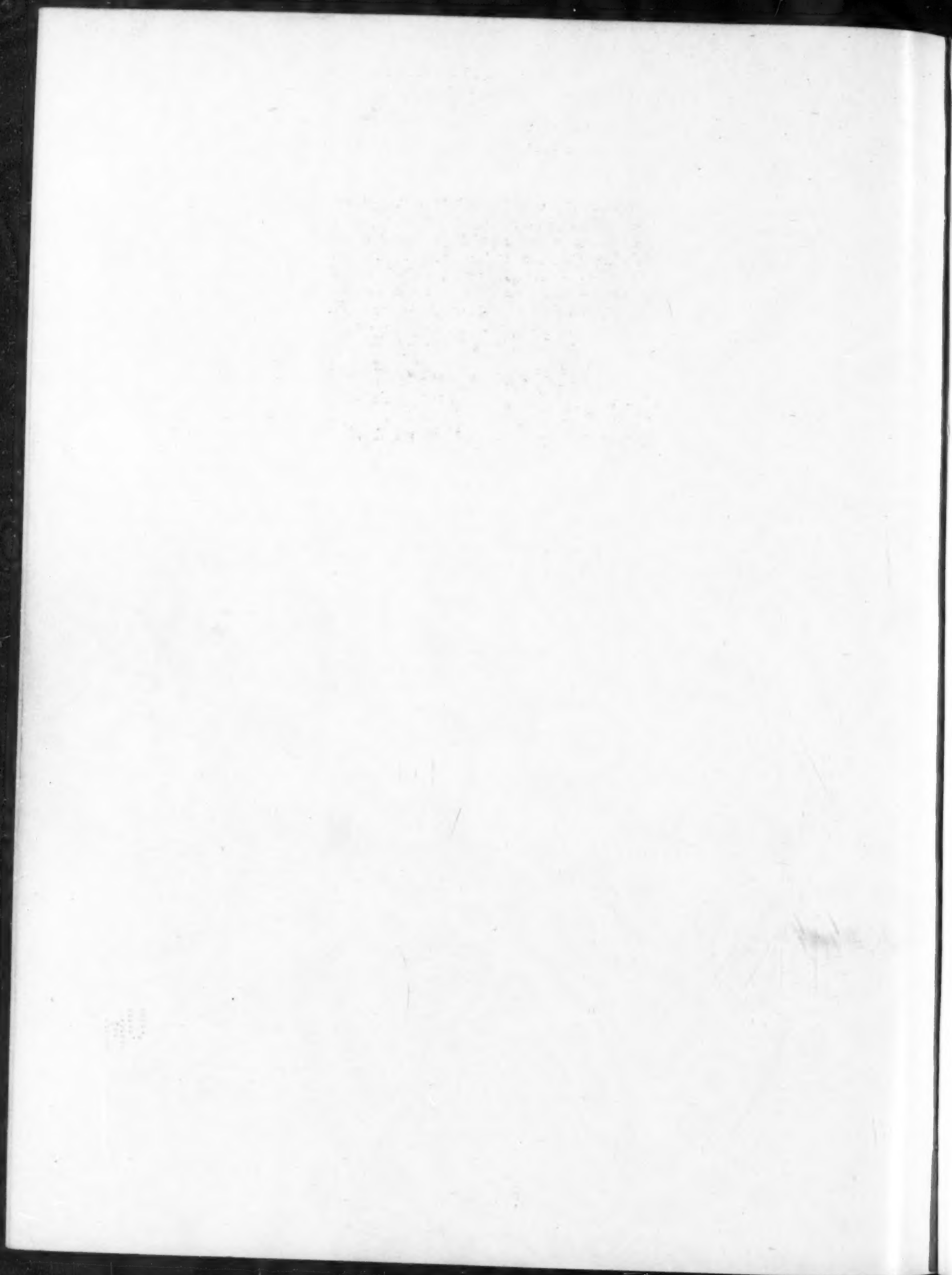
SILL, BUCKLER & FENHAGEN, ARCHITECTS





ACCEPTED DESIGN, COMPETITION FOR FEDERAL RESERVE BANK OF NEW YORK, N. Y.
YORK & SAWYER, ARCHITECTS

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JAN 10 1964
LIBRARY
UNIVERSITY OF MICHIGAN



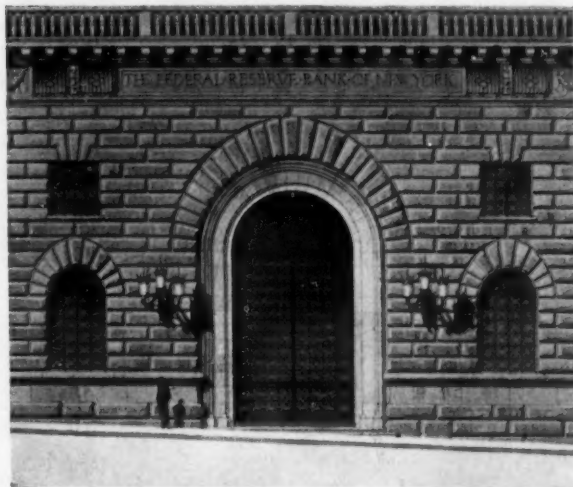
The Federal Reserve Bank of New York

ACCEPTED DESIGN IN RECENT COMPETITION

YORK & SAWYER, ARCHITECTS

A MOST interesting architectural problem was involved in the recent competition for the Federal Reserve Bank of New York. This huge institution will require the largest bank building in the country to house its activities, and this fact, coupled with the prestige that will center about the structure because of the great financial matters to be considered within it, offered exceptional opportunity for the creation of a notable piece of architecture.

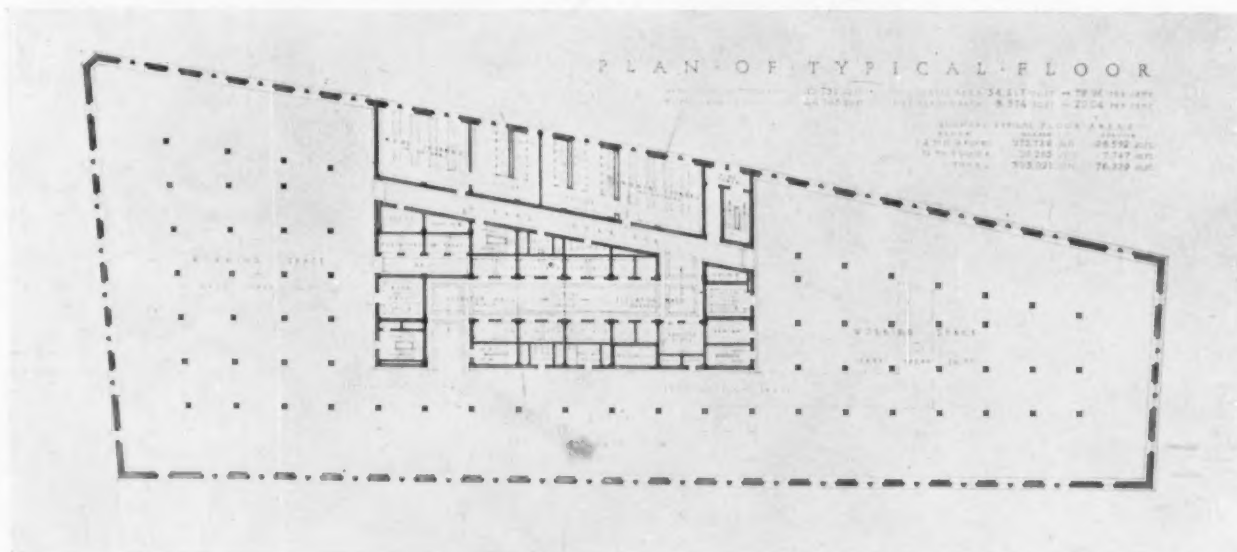
The program of the competition contained a special plea for an exterior treatment of extreme simplicity, relying upon the ability of the competitors to produce an architecture which would depend upon good proportion and a refined simplicity rather than ornamentation or anything which might be considered ostentatious. The Federal Reserve Board in Washington is anxious to have the architecture of the Reserve Banks appropriate to their use. A Reserve Bank is not in any sense a competitor of other banks in its neighborhood, and does not require costly architecture for the sake of advertising. Its relation to this question is precisely like that of a well designed and well



Detail of Liberty Street Entrance

built Government building, where the effort is to create an architecture which will be of educational value, with elimination of everything which tends to commercializing or capitalizing the architecture for business purposes. The program for the New York bank was written with this thought in mind, and it is believed that the design of Messrs. York & Sawyer interprets this requirement to a nice de-

gree. It is not too much to say that the architecture they have chosen and the manner in which they have used it is not unlike a fine piece of literary workmanship in which nothing can be omitted or added without injury to the quality of the work. From an economic viewpoint, the façade is as inexpensive a type of architecture as would be possible to use in a first-class modern building, and is free from the columns and pilasters and the many mouldings that are a customary part of Classic or Renaissance architecture. This design represents a certain phase of early Italian Renaissance, in which a slight trace of the Gothic influence is still apparent. The fact that the architects were able to produce an imposing structure without resorting to the usual orders of architecture is specially



Typical Floor Plan

commendable and helpful as a progressive sign.

The architecture of medieval Florence, which is the direct inspiration for the character of this design, suggests an appropriateness which possibly arises from the fact that it was the endeavor of the Florentines to make their palaces impregnable and secure against the attacks of rival cities. The heavy rustication in the lower stories is a special feature of that style and lends to a building a fortress-like appearance which, in a sense, is what a bank should exemplify. In other words, the architecture suggests security even though the requirements of the organization demand large window openings.

The competition called for plans of two basements, the first floor, the second, a typical floor, and one of the two stories on the roof. The typical floor is an important element in the problem. The bank to-day has 2,800 employees distributed over a large number of departments. It is constantly changing, not only in size but in methods of doing business, and it is unsafe to say that an arrangement in floor plan showing the distribution of equipment in any one department which is satisfactory to-day would necessarily be equally satisfactory one year from now. In consequence, the competition was conducted with a view to securing the most elastic type of plan, thus permitting the bank officers to study at their leisure the placing of departments on these typical floors. It will be observed that the architectural treatment on the exterior admirably expresses this idea, since the typical floors are generally indicated by a very simple type of fenestration.

The site for the building is just above the center of the financial district in lower New York City. It has an area of 46,025 square feet and comprises a full block, with the exception of a small piece of land at the William street end. It is bounded on the opposite end by Nassau street and on the long sides by Liberty street and Maiden lane, with the main entrance from Liberty street. There is a difference in grade between the ends of the Liberty street frontage of 17 feet 5 inches. Due to the special nature of the business carried on by the bank and the large number of employees (estimated to be eventually 4,000), the control of entrances and provision for elevator service are important features in the plan. One entrance from Liberty street provides access for the officers of the bank, visitors and customers. An entrance on Maiden lane is for all employees below the grade of department heads who will enter the building at intervals between 8.15 and 9 o'clock on definite schedules to accord with the elevator facilities. The elevators for public and employees and the corridors serving them are disposed so

that there are no means of communication between public and private sections of the building.

Large shipments of bullion, coins, securities, etc., will be frequent, and provision for this feature is made by the entrance for motor trucks into the basement from Maiden lane. Here is a shipping platform directly below the money shipment room and in convenient relation to the vaults at the western end of the building, to and from which money will be transferred by small electric trucks.

The loggia at the top of the building carries around on the four sides and produces a promenade to be used chiefly at lunch time. Behind the loggia are two floors devoted to welfare work and cafeteria service,—one assigned to women employees and the other to men. The cafeterias contain space which is large enough to serve 4,000 employees if they are seated in three different shifts.

The volume of the building is somewhat more than 11,000,000 cubic feet, and with building costs continually mounting the bank is faced with the necessity of expending for this building a good deal more than would have been required a year ago. The present program of the bank does not contemplate immediate construction. The architects have been authorized, however, to continue their studies and in due time will be authorized to make working drawings and prosecute that part of the work without delay. Alexander B. Trowbridge, consulting architect for the Federal Reserve Board, served as professional adviser in the competition.

In conclusion it may be stated with confidence that the accepted design is a distinct addition to modern architecture. The fact that it is inspired from Italian sources is, after all, a minor detail. There is no building in Italy which remotely resembles this design, and yet the architects have borrowed freely from the good taste and the monumental quality of some of the fine examples of Italian art. Many an observer of the drawings will be tempted to question the placing of the main entrance to one side of the middle of the principal elevation. This is a point which would be important if this elevation were situated where it could be seen in its entirety. It is, however, placed on a narrow street, and the 365 feet of length is such as to make it quite impossible for an observer to see from any one point the entire composition. The placing of the main entrance was regarded as a practical question rather than one relating to architectural composition, and the designers have been courageous enough to carry this out with great frankness and with a proper disregard of the academic tradition which would influence other types of designers.

The Chapin Memorial Presbyterian Church, Niles, Mich.

TALLMADGE & WATSON, ARCHITECTS

THIS church occupies the site of an ancient and honorable fane of the period of the Classic Revival. This church, built in 1850, had become inadequate in all respects and entirely without modern improvements or even necessities. With many regrets in the hearts of the architects, at least, and after an ineffectual attempt to move it, this fine old relic of the past was necessarily laid low.

The new church, which by the way embodies the architects' original sketch almost without change, in plan incorporates auditorium, Sunday school and manse, the three features being linked by a cloister or arcade. The auditorium seating 600 opens through its transepts into the Sunday school; this is equipped with class rooms after the Akron arrangement, with a ladies' parlor and an especially light and ample kitchen. The church is not an institutional one, and so beyond arrangements for moving pictures and a boys' club in the basement, there are no features apart from the usual orthodox establishment.

In style the building is a modernized form of Gothic with personal and local elements in the ascendant. The material is a rough, warm gray texture brick laid with raked joints, and the trim is buff Bedford stone with a rubbed surface. The brick is enlivened with various patterns and the stone with carved ornamentation. Around the tower is a sculptured band with angels supporting

shields at the corners. The medallions are carved with the fauna of early Michigan, including a Pottawatomi Indian, and the band itself with oak leaves and acorns. The tracery is of stone and all of the windows are of leaded stained glass.

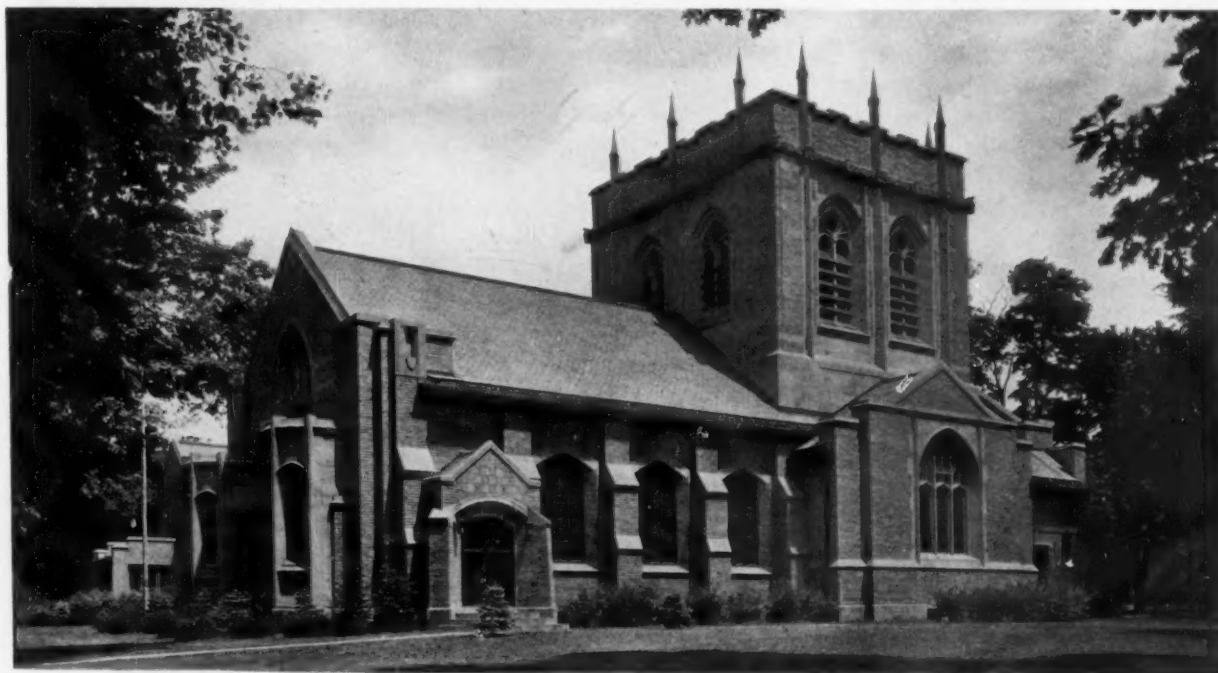
The nave east window represents the old dispensation with those who had foretold the coming of Christ. Figures of Elijah, Isaiah and Moses fill the panels, with Christ above in a mandorla. The transept window represents the new dispensation with figures of Paul, Peter, John the Baptist and John the Evangelist. Particularly beautiful is the east window with the celestial choir singing "Alleluia for the Lord Omnipotent reigneth."

The windows are all in full color and represent a high water mark in the art of glass making.

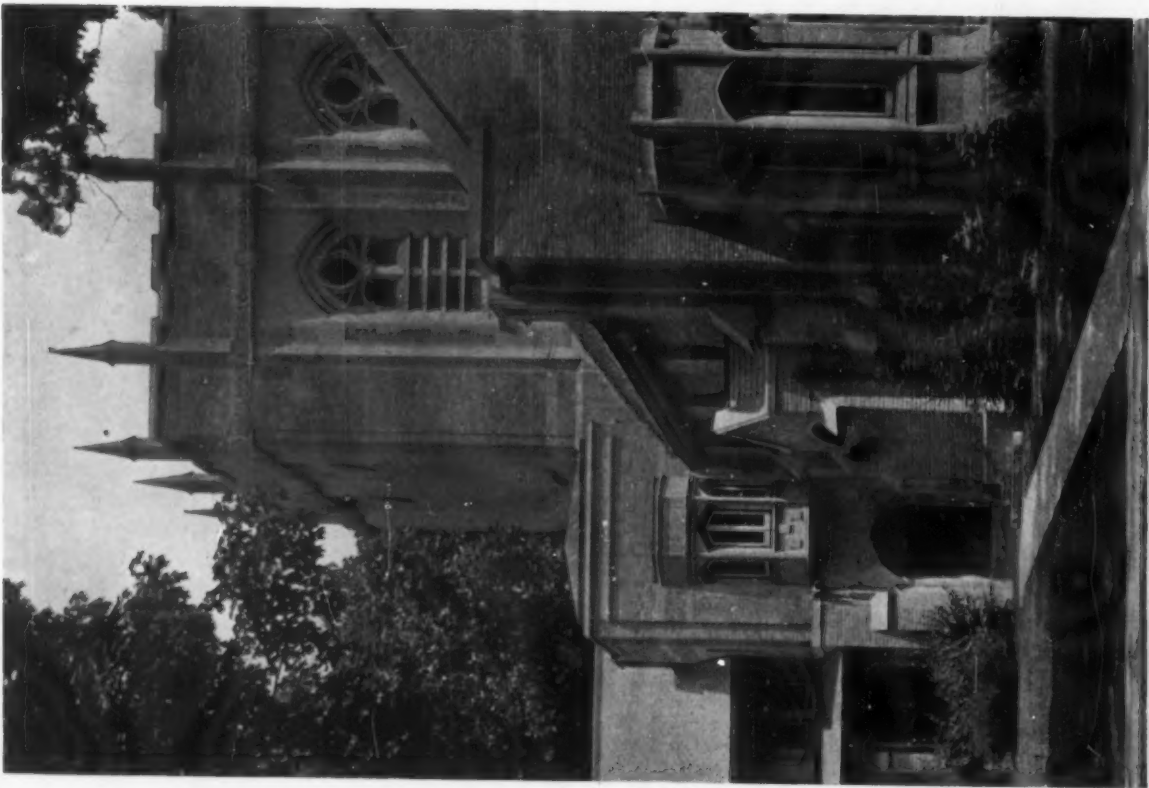
The side windows in the nave take the place of old memorial windows in the original church and repeat the old inscriptions. They are grayish green, original in design and without high color.

The interior is rough plaster tinted a faded golden hue, and the trim, including the ceiling, is of dark red oak.

The entire group, including all of the furnishings down to the last tin cup and hymnal, was the gift of the widow and children of Charles A. Chapin, a descendant of a pioneer family of Michigan, and of the old Puritan, Deacon Chapin, immortalized by the art of Daniel Chester French. The church was built in 1915 and cost \$75,000.

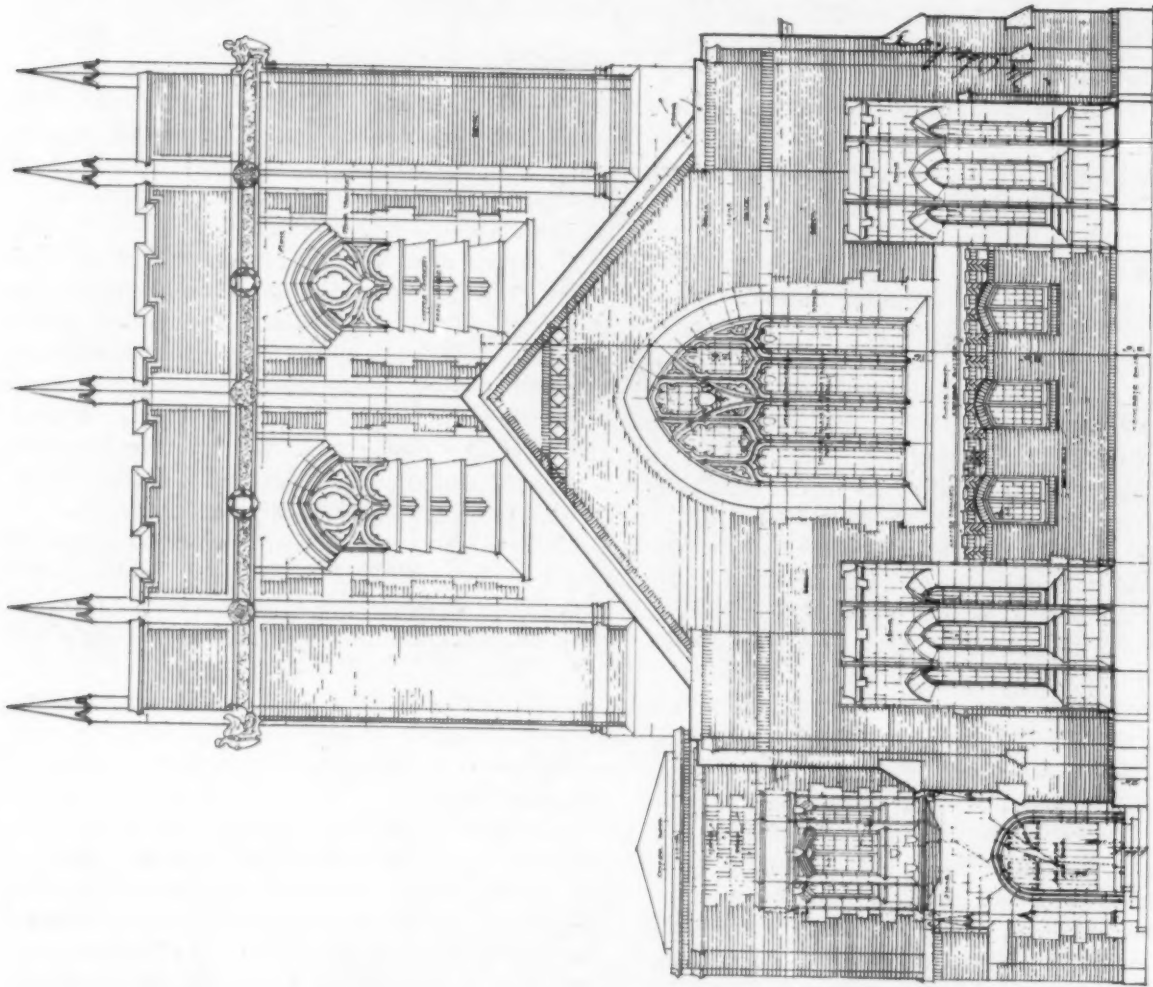


Chapin Memorial Presbyterian Church, Niles, Mich.



DETAIL OF TOWER AND CLOISTER ENTRANCE

CHAPIN MEMORIAL PRESBYTERIAN CHURCH, NILES, MICH.
TALLMADGE & WATSON, ARCHITECTS



DETAIL OF MAIN ELEVATION



William McKinley Memorial, Niles, Ohio

McKIM, MEAD & WHITE, ARCHITECTS

THE National McKinley Birthplace Memorial Association—a society chartered by Congress in 1911—proposed in 1914 to erect a memorial to William McKinley in his native city, and held an architectural competition.

The following quotation from the program of the competition gives the character of the problem:

"The projected memorial will take the form of a monument and a building so grouped as to form an ensemble. The monument will consist of a full-figure statue of President McKinley, with suitable pedestal and architectural setting. The building, while destined for practical service to the community, should nevertheless be designed in the spirit of a memorial."

The requirements of the building were an auditorium, a public library, a museum room for McKinley memorials and the meeting of local posts of war veterans, offices for trustees and service rooms. Settings were to be provided for tablets to donors and busts of local historical personages and associates of the late president.

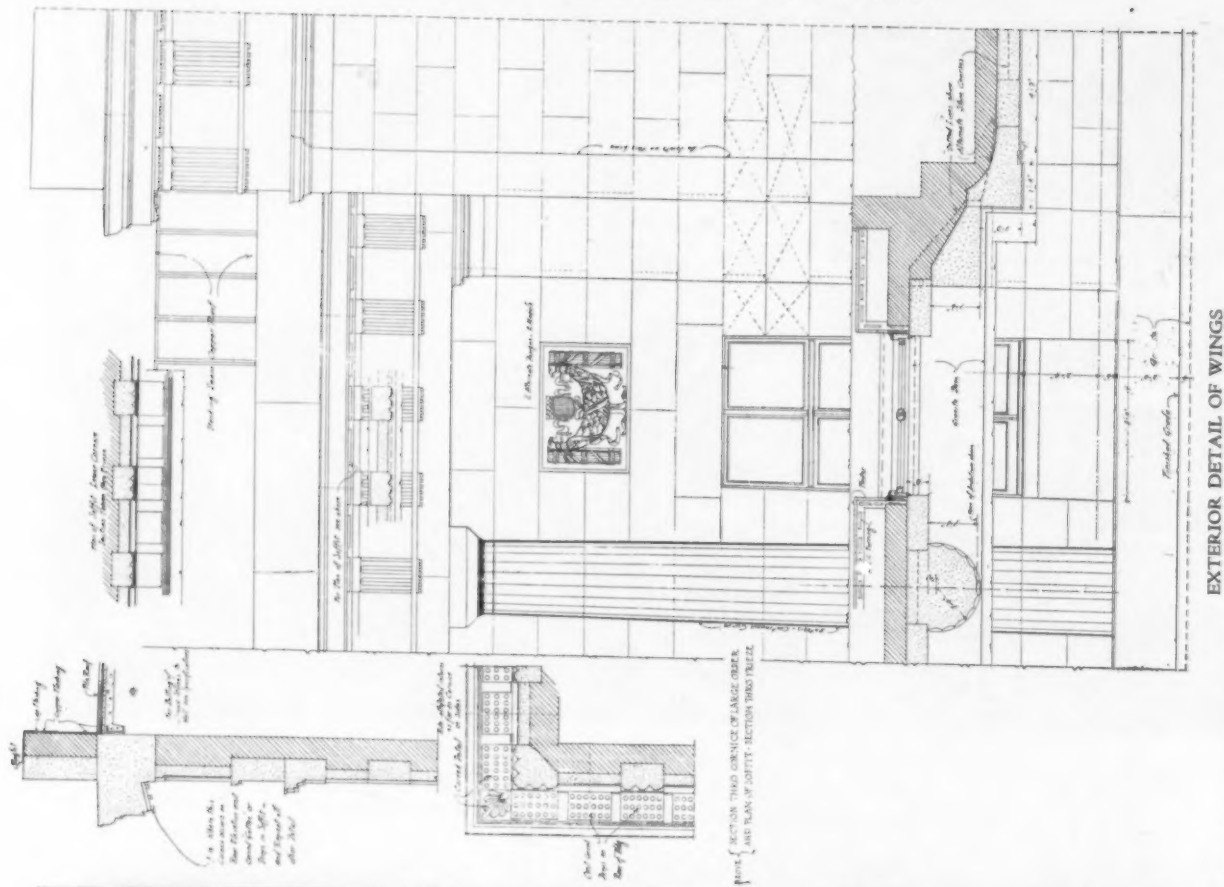
McKim, Mead & White were selected as architects in the competition, and Massey Rhind was appointed sculptor by the building committee.

The building was carried out by the architects without a single important deviation from the competition drawings, and an inspection of the accompanying illustrations will show how appro-

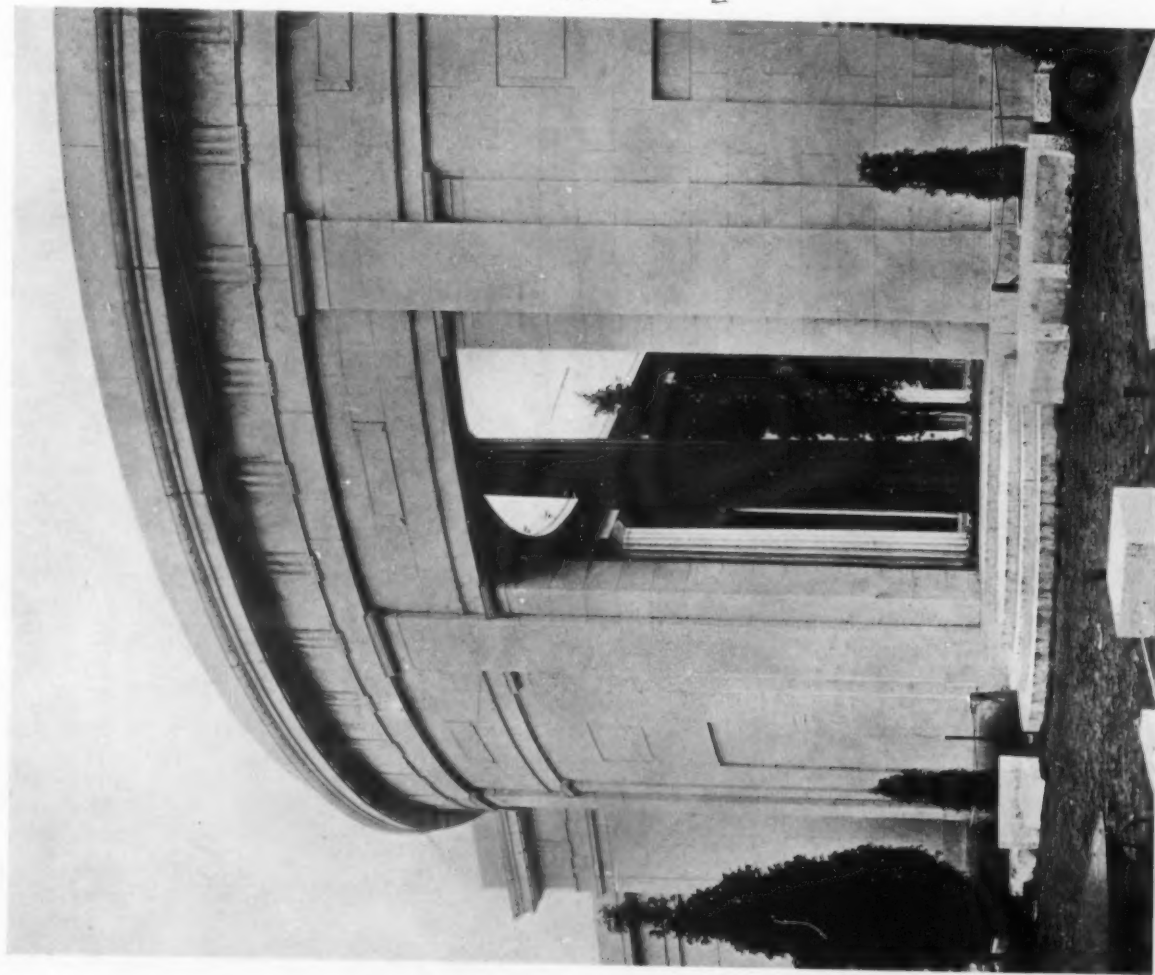
priate to the problem their solution has proven to be. The memorial statue is placed in an open atrium surrounded by a colonnade of great delicacy of proportion in the Doric style. The auditorium and library are both street level rooms, and the isolation of the auditorium permits of an economical operation of the heating plant, as well as insuring a quiet library.

The exterior of the building is faced with white Georgia marble, and the statue and pedestal are of the same material. The ceiling of the open colonnade shows a very interesting use of architectural terra cotta. A classic coffered ceiling was designed and this was executed in polychrome terra cotta of a cream white ground, upon which the ornament is picked out in the primary colors of the ancient Greek palette, — blue, yellow, red and green.

The color scheme was worked out after a careful study of the available records of Greek polychrome decoration and executed with the hearty co-operation of the terra-cotta manufacturers, who extended themselves to produce the clear and brilliant colors in the small quantities and confined spaces which the style demanded. The effect produced is of great beauty and decision, due to the use of limited quantities of strong color, rather than broader masses of "pastel shades," which are often employed by modern designers in their all too rare excursions into this field of designing in color.



EXTERIOR DETAIL OF WINGS



DETAIL OF REAR ELEVATION

WILLIAM MCKINLEY MEMORIAL, NILES, OHIO
MCKIM, MEAD & WHITE, ARCHITECTS

A Modern Quest for the Archaic

THE SCULPTURAL WORK OF EDWARD FIELD SANFORD, JR.

By J. ARTHUR BARTRAM

IN attempting to show the beauty and importance of the archaic influence in sculpture to-day it is scarcely necessary to dwell upon that particular epoch of Greek art which, starting with the early Dædalid school whence the art of Peloponnesus was derived, through the period of Peisistratus, to which Athens was indebted for its chief artistic inspiration, finally reached the most glorious era of all—the age of Pericles, of whom it was said: “He found Athens of brick and left it of marble!”

It is generally conceived that the products of various arts as practised by a people constitute an important record of a nation. One of our modern critics, Taine, regards the fine arts as the necessary result of the general conditions under which they are at any time produced—conditions of race, climate, religion, civilization and manners. It is extremely difficult to make this opinion conform to the artistic school of 1919, since, in our eastern cities particularly, owing to the many racial elements which go to make up the contents of our national melting pot, such conditions are almost impossible to define.

It is small wonder, then, that the searcher for beauty in modern sculpture would naturally seek a modern artist who embodied to the full the glorious traditions of the past, rather than to seek artistic gratification in the results evolved from the undigested mass of races and traditions so characteristic of our country to-day. The search will be successful. We may indeed find a sculptor whose work is a most interesting combination of purely Greek inspiration and Anglo-Saxon clarity of execution. This unusual modern successor of the Periclean “golden age” is Edward Field Sanford, Jr.

In regard to the archaic Greeks, however, Mr. Taine's view was decidedly *a propos*, as their sculpture

was the result of a wonderful national life, unmarred by commercial strife, the product of a period of great united energy. They found their ideals in varieties of the human form as presented by the most harmoniously developed specimens of the race, under conditions of the greatest activity, health and grace. To the perfect physical condition demanded of candidates for the Olympic games, we owe the resulting types of rhythmical composition and design which, through art, has made the life of the nation immortal.

In speaking of Greek classic art it is almost impossible to separate architecture from sculpture. The two were indissolubly bound together. In those days, as in the later Renaissance period, the architect was a master of sculpture, and the sculptor of architecture. The most perfect buildings were designed as temples for the gods, and the most beautiful statues the concrete representations of the dwellers upon Olympus. In those days architecture necessitated the possession by the builder of imagination as well as technical skill, and as an

art was so employed as to arrange the plans, masses and enrichments of a structure so as to impart to it interest, beauty, grandeur, utility and power. Vitruvius, the only ancient writer on the art of architecture whose works have survived, lays down three qualities as indispensable in sculpture and in a fine building: *firmitas, utilitas, venustas*, stability, utility and beauty. Through the later period of classical revival which culminated in the Renaissance, Vitruvius is the chief authority, and in every point his precepts were accepted as final. Bramante, Michael Angelo, Palladio, Vignola and earlier architects were careful students of Vitruvius, who through them has largely influenced the architecture of almost all European countries.

Since the period, how-



Hercules — Garden Figure
Edward Field Sanford, Jr., Sculptor

ever, of Greek classic art, the world has experienced no revolution in art, but there has been a series of evolutions from the days of the Romans down to our own era. Thus it is not difficult to see whence the Renaissance sprang and to what we owe the various forms of Renaissance art. Achievements of such masters as Donatello and Michael Angelo were based on a new and impassioned study of nature and the ancients together, and in the hands of these artists a fortunate blending of the two ideas yielded results of a poignant and unique charm, thus making us the heirs both of antiquity and the Middle Ages—an inheritance which even the most flagrant misuse has not yet exhausted.

Yet this medieval awakening to the beauty of classic art can no more be described as a copy of the ancients than can our own modern artists be accused of a mere revival of thought, or even of Renaissance feeling. On the contrary, to those old forms of human soul and skill, such finished artists as Mr. Sanford have added whatever of artistic value the intricacy, complexity and experience of modern life can give.

Of all the classic arts, sculpture was the one most appropriate to ages of lucid and self-possessed ideas, and to the modern artist as well as to the archaic Greek that work should be most instinct with spiritual life which conforms most clearly with the perfect facts of physical life. And yet perfection of form alone is not enough. No true artist can be content with the mere copying of the most ideally beautiful body. Such work has often been done, with a result that makes one deplore the frequent successes of mediocrity. Thus it is most refreshing to find that Mr. Sanford's sculptures treat not only of the permanent and essential truth of life as portrayed in physical perfection, but also endow the art with that higher intellectual appeal which marks the distinctive works of the really successful sculptor.

It is impossible for a work of art to conform to the aesthetic demands of its age. On the contrary, it is for the artist to create that demand, even



Archaic Greek Head

a more decorative value. There must always be that desire for a nobler form of life, for a freer method and opportunity of expression. As Whistler points out, the power of the artist is to be found in his power of vision, not in his cleverness of hand. The soul of the artist must express itself in the form most proper to it, and one of the chief func-

tions of the imagination is to make up for the shortcomings of reality.

One experiences considerable difficulty in selecting a single artist as representative of this school of modern archaic sculpture. But in order to show those works most characteristic of the early Greek period it is necessary to choose that man whose sculptures consist not only of exquisite modeling, but also taste in choice of appropriate architectural skill as well. Just as the delicate lines and delightful proportions of Greek forms were so exquisitely echoed in their temples and public buildings, so have the most successful of our modern artists



Antique Fighting Hercules

employed skill in professions analogous to, but not essentially a part of, their own branch of art. In the golden days of Florentine art the greatest men were generally painters, sculptors, architects and goldsmiths all at once. In using the word "goldsmith" one does not mean to imply that they actually produced metal tableware or jewelry alone, but that they employed that exquisite detail of design and execution which has always been preëminently characteristic of the art of Benvenuto Cellini.

In our modern school we have the combinations of sculptor and goldsmith, several sculptors and

architects, but, so far as one is able to judge, only one prominent example where the three are combined. As the most interesting exponent of this new and virile school of sculpture, for the happy combination of sculpture, architecture and design, one may safely select the works of Edward Field Sanford, Jr.

One cannot dwell too much upon the importance of study to the serious artist, both as a means of inspiration and of perfecting style. The results of sincere study and research are so apparent in Mr. Sanford's sculpture that it is most interesting to show in connection with the views of his works selected for this article, photographs of archaic sculptures which might, consciously or otherwise, have been a direct influence. Just as Michael Angelo used the antique torso of the Hercules, now in the Vatican, for the lodestar of his artistic career, so has Mr. Sanford availed himself of the marvelous archaic sculptures which are now fortunately accessible to every artist.

In the western group of figures for the mausoleum, of which Mr. H. Van Buren Magonigle is the architect, a building of early Doric design, Mr. Sanford has achieved a work for which in intellectual sympathy and capacity of understanding could scarcely be surpassed by the sculptors of the school of Praxiteles. Setting aside the mere beauty of form, the grace and loveliness of design and delicacy of technical treatment of this group of two figures, it is impossible not to be fascinated by the exquisite employment of detail and by the treatment which is so simple in its means, so subtle in its effect. In the pictured reproduction of an archaic head, the influence of its eccentric head-dress is to be plainly seen upon that of Mr. Sanford's seated figure. To the cultured critic, perhaps, the most interesting detail is the way in which the lines of drapery reflect the delicate fluted columns of the building which forms the background. The kneeling figure is faultlessly modeled and admirably demonstrates that the artist has that more perfect knowledge of how to make a space decorative without decorating it. The feminine luxuriance of form is subdued by a constant inexplicable reserve and modesty. Both figures have that calm and perfect repose which should be the effect

of all fine, imaginative work. In the whole blended harmony of lines there is a faultless devotion to beauty and a more intense seeking for perfection, showing that the artist is a master of exquisite design as well as of all spiritual vision.

The figure of Hercules, shown in a garden niche, while not so interesting from the viewpoint of composition and detail, is a marvelous exposition of perfect modeling and calm dignity. While not challenging the immediate attention of the critic, it is a work which should always endure through mere perfection of form if for no other qualities. It has a style flawless and fearless, a sustaining consciousness of the relative value of each form to the entire. One is impressed anew with the indisputable fact that forms which flow most naturally and easily from the hand of an artist are always those most pleasing to the eye. In conjunction with this modern conception is shown the antique fighting



Group of Figures for Mausoleum

H. Van Buren Magonigle, Architect ; Edward Field Sanford, Jr., Sculptor



Marble Great Dane
Edward Field Sanford, Jr., Sculptor

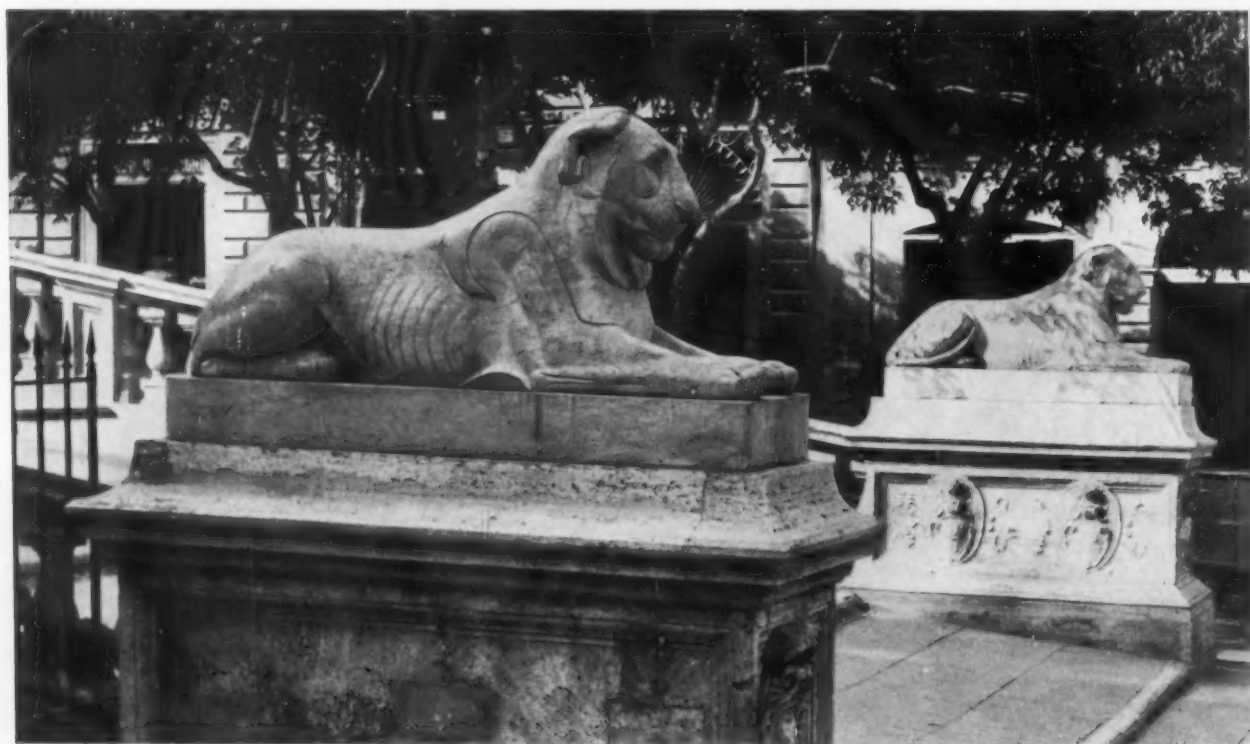
Hercules—a perfectly sculptured body which through the vicissitudes of hundreds of years still stands preëminent as one of the finest examples of the perfection of conventional anatomical forms.

In the photograph of the archaic lions placed centuries ago by Michael Angelo at the foot of the Capitoline Hill, where they still crouch indomitable and majestic in their calm repose, we have perhaps the best example of the work of archaic animal sculptors. In Mr. Sanford's Great Dane there is a similar quality of intensified, immobile life—a dog so true to nature, yet so essentially conventional. Upon viewing this marble one feels that creative greatness consists not only in feeling much, but in controlling much. Here is the perfectly realized opportunity for the portrayal of

that intensified vitality of action which is so essentially characteristic of the Great Dane. It would be impossible for increased value to be laid on elaborate design, or on curious anatomical construction. One realizes anew that all great art is delicate art, roughness having very little to do with strength, and harshness very little to do with power. In this marble dog there is all that restraining influence of design which

is the glory of the Parthenon. This figure is not one of ideas merely, but also of execution; not one of conception, but of creation. It might be a far more intricate wonder of design, but how much more worthy of the noble animal portrayed and of the dignity and genius of the sculptor is this almost living exponent of that power which controls the imagination of the artist in dealing with his subject.

For the artist no form should be obsolete, no subject out of date; for our modern artists whatever of life and passion the world has known lies before them, virile with beautiful life. They may choose or reject with the calm, artistic control of those in possession of the secret of beauty. As Plato has expressed it, "The beautiful is nothing else than the visible form of the good!"



Archaic Lions at Foot of Capitoline Hill, Rome

DEPARTMENT OF ENGINEERING & CONSTRUCTION

CHARLES A. WHITTEMORE, *Associate Editor*

Drainage Problems in Large Buildings

By F. R. C. BOYD, B.A.

WHILE the problems of drainage in large buildings, unlike the considerations of architectural style, finish and decoration, obviously lack the direct appeal to the artistic sense of architect and owner, they are nevertheless deserving of careful consideration from the utilitarian, sanitary and revenue-producing points of view. The fact that in the majority of large modern buildings the sub-basements are located below the grades of existing street sewers, renders it necessary to provide means in such cases for the collection and disposal not only of such sewage and seepage as may normally originate in sub-basements and other areas below sewer level, but also for handling in emergencies much larger quantities of water which may result from the breakage of pipes within the building, flooding from excessive storms, from fire extinguishing apparatus within or without, from temporary overloading of street storm sewers, from failures of foundation wall waterproofing, and from a variety of other causes of varying probabilities of actual occurrence.

Earlier buildings were provided with steam pumps of more or less ineffectual design or arrangement and generally so disposed as to require starting and stopping by the manual control of an attendant. The expense of operation of such steam pumps, combined with their unreliability when handling sewage, their requirements for frequent shutdowns for cleaning and repairs, and their general unsuitability to the problem, led to the development of the two methods now most commonly and universally used,—the pneumatic method and the electric method.

The Pneumatic Type

The pneumatic method was first developed in Great Britain as long ago as the year 1880, at which time the first installation of any appreciable magnitude was carried out on designs of Isaac Shone in a sewage pumping problem at Eastbourne, England. The general principles of this system, and in fact most of the details as well, have remained practically unchanged from that time until the present. The success of the initial installation at Eastbourne, which was for an ultimate capacity of 2,592,000 gallons of sewage per 24 hours, indicated the entire feasibility of sewage ejection from the basements and lower areas of large

buildings. One of the earliest of such instances was afforded by the problem presented in the British Imperial Houses of Parliament at Westminster. The problem in this case was typical of that presented by the large modern building in every way in that the sewage and drainage were collected at a point below the level of the outside sewer. It was essential to eliminate the possibility of odors finding their way into the building; the apparatus should be automatic in action, "fool proof" in construction, and operating with a minimum of moving parts; the operating cost should be appreciably lower than that of a system involving a constant attendant; the space occupied should be inappreciable, and, above all, the reliability factor should be 100 per cent, even although the demands varied in this instance from a normal sewage flow of only about 50 gallons per minute to a maximum required ejection of 1,200 gallons per minute during heavy rains.

In discussing this type of an ejector it should be borne in mind that during recent years various developments and modifications over the original type have taken place and many different kinds of pneumatic ejectors have been installed. Some are connected with compression tanks where the air is compressed by steam pumps for other purposes in connection with the building. Some have their own electric compressors and some are operated by directly connected steam. The principles involved, however, are the same in each case except for the mechanical differences, and the architect in determining which type of a pneumatic ejector is best suited, before the type is chosen, should investigate the other mechanical equipment of the building. For instance, if compressed air is used in large quantities in connection with a manufacturing or mechanical establishment, it might obviously be superfluous to install the electrically driven pump for air compression. On the other hand, if live steam is created in considerable quantity, a steam pump might solve the problem for air compression better than an electric motor.

Method of Operation

To those unfamiliar with this type of ejector a brief explanation of the details may be of interest. The ejectors are either single units or duplex units, and this difference lies only in the tanks.

The storage receptacle into which the sewage from the building flows by gravity is usually a cast-iron receptacle, although in some installations concrete has been used. During the process of "filling," the tank is vented to the atmosphere by a pipe connected directly with the chimney or carried up independently through the building. When the tank becomes nearly filled a float mechanism inside the tank trips an air valve, which in turn allows the compressed air to enter the tank at the top above the sewage. The vent open to the atmosphere is automatically closed by a check valve, and the "fill" pipe also is automatically closed due to the pressure of the compressed air on the top of the sewage. Simultaneously the check valve in the discharge pipe is opened. This completes the mechanical operation. The air pressure is now exerted entirely on the material in the tank and completely empties the tank in a few seconds. The fall in the level of the sewage in the tank causes the float mechanism to restore the air valve to its original position, thus shutting off the air pressure from the compression system and, by opening the air valve in the vent, exhausts the residual pressure to the atmosphere.

At the same time the discharge check valve closes and the inlet check valve opens, allowing the tank again to be filled by the flow of sewage through the inlet pipe, and thus the operation is ready to begin over again.

One of the most important details of this mechanism is the float which operates the air valve. Various types of pneumatic ejectors on the market to-day each have a slight difference in this particular feature, but the principle of them all is the same. All of the other details of this pneumatic type are absolutely simple.

The duplex feature of the arrangement of two tanks will commend itself at once to architect, engineer and building owner. It affords not only a spare unit to be used during the occasional periods of repair of one unit, but also a doubled capacity for periods of emergency. From the construction and operation of this type involving the use of no moving pistons or parts for impelling the sewage, but only the direct action of compressed air on the whole upper surface of the sewage in the pot, it will be apparent that any and all sewage of whatever description which can find ingress to the pots through the sewage piping of the building is certain to be completely ejected at each "dump," without the necessity of providing any means of screening, with the attendant expense for cleaning.

The air pressure for operating a pneumatic ejector, as has been previously noted, may be taken from the air pressure system with which many large buildings are provided; but whatever

the source, the pressure required is merely that necessary to overcome the head against which the sewage is to be ejected and raise it to the level of the street sewers. The calculation of this head would not be exact nor sufficiently accurate if all consideration of friction loss in the pipes were omitted. In many instances the pipes are so arranged that a direct line may not be obtained. In such installations each angle or bend in the pipe produces an extra friction which must be taken into account in estimating the pressure.

The Electric Type

The electric method is an American development first worked out along the lines of its present standardized form in Chicago in the year 1903, and the leading reasons for its development are threefold:

First, is the admitted fact that the tendency for electrification of all possible operations and processes has been more rapid here than abroad.

Second, and almost conversely, is the fact that pneumatic methods of handling operations, even including power transmission, had in the years preceding the comparatively recent electric era been worked out very extensively in Great Britain and the continent, which condition did not obtain here, nor does it now, and it is improbable that it ever will. London, for example, has for years maintained large central stations for compressing air which is piped for considerable distances and sold for varied power purposes, and a company in Paris has successfully transmitted compressed air power for miles. The logical appeal, consequently, of the pneumatic ejector to such conditions where the relatively simple iron tank can be installed cheaply, and operated merely at the actual cost of compressed air from street mains, purchased as required, is very great. The absence of such a source of compressed air power in America renders it necessary in our buildings, not equipped with air compressing plants for other purposes, to install for operating pneumatic ejectors a complete air compressing plant and, in order to be reliable and free from shutdowns, this plant must consist of duplicate apparatus throughout.

The third reason for the development of the electric ejector is merely the obvious corollary of the above two reasons: American conditions have demonstrated the need and the demand for an ejector working directly from the most common source of power — electricity; an ejector is desired which is self contained without auxiliary apparatus, low in initial cost and in cost of operation, limited in floor space and excavation requirements, and possessing the 100 per cent reliability features of the straight pneumatic type.

Method of Operation

Unlike the pneumatic duplex type which requires two pots, this type requires only one sewage collecting receptacle, for since it is never subjected to other than atmospheric pressure, both of the ejecting pumps can draw either separately or simultaneously from the same receptacle and at the same time sewage can be flowing into the receptacle. The two ejecting pumps are of a special design of centrifugal pump with large passages and having impellers designed to handle the exacting requirements of practically unscreened sewage. They are located at the bottom of the open ejector pit drawing the sewage from the lowest portion of the receptacle, and are driven by vertical motors mounted on the extended cover plate at the basement or operating floor level. When the inflowing sewage reaches a predetermined level in the receptacle, a simple float mechanism actuates the automatic motor starters, the adjustment of the tappets on the float rod being such that ordinarily only one motor and pump will start when the sewage receptacle becomes filled to the predetermined level. In case of failure of the first unit, a further inflow of sewage will cause the second motor and pump to start, which action would similarly occur in case the first unit, although operative and starting properly, were unable to handle the total amount of sewage as fast as it flowed into the receptacle. This method of operation constitutes the same desirable feature of duplex protection as earlier described for the pneumatic type with the increased advantage that not only can both units operate for emergency conditions, but they can operate continuously.

The central sewage receptacle is provided near its lower end and somewhat above the pump suction with a grating which acts as a screen to prevent large objects, such as sticks, getting into the pump, and if necessary any accumulation can be readily removed through the hand hole without interfering with the ejector operation. In practice such accumulation is either entirely absent or practically negligible, as the special design of the ejecting pumps permits their successfully ejecting any material which can find its way through the building sewage piping to the receptacle. By means of valves it is possible at any time to isolate either pump from the sewage receptacle so it can be inspected or repaired, or completely removed if desired while the other pump continues in operation. A further desirable feature of this type of ejector is the fact that it can pump out its own pit in which it is installed in case through leakage or other cause water should start to accumulate therein; each ejecting pump is fitted with an auxiliary valve for this purpose, whereas the pneu-

matic type requires an independent means of keeping the ejector pit pumped out.

The Submerged Type

Where the problems of drainage do not involve the handling of sewage, but merely the water coming from seepage, imperfect waterproofing, underground sources, the drainage of storm water from low areas, or the protection of a basement as insurance against possible periods of flooding, a less expensive form of apparatus may be used, consisting merely of a sump tank in which is located a vertical submerged centrifugal pump driven by a vertical motor above the floor level. Such arrangements, generally referred to as bilge pumps to distinguish them from sewage ejectors, may be of either the single or duplex type. Units of this type are obviously unsuited to handling sewage on account of the absence of the features described above embodied in the duplex ejector, and particularly the difficulty of cleaning and making repairs on the submerged pumps without interrupting the operation of the unit.

Another phase of the drainage problem which at times may be overlooked is that of handling small leakages or seepage through surface water penetrating walls. The submerged type has been used where this condition exists in considerable quantity, but for small installations where only an occasional demand may be made upon them another type of ejector is frequently used. This type is sometimes known as the sump pump, water ejector, etc. It consists of a receptacle with a grating at the top through which the water may flow. In this receptacle there is a float which when it reaches a predetermined point, due to the rise of water in the receptacle, automatically opens a water jet. This jet throws a stream of water into the exhaust line and by creating partial vacuum "sucks out" all the water in the sump. In some installations a steam jet is used and is known as an aspirator. Installations of this character are frequently installed in boiler rooms where the demand is only from the excess water used in washing down the coal or in washing the floor.

General

In determining the capacity of an ejector in "gallons per minute" as they are generally rated, it should be kept in mind that the average daily flow of sewage divided by 24 hours, and again by 60 minutes, is an entirely wrong criterion, since the flows vary greatly at different hours of the day and even different minutes of the hour. A study should be made of what might constitute the maximum flow condition, that is, when every fixture and drain is in service — a condition which might

obtain, for example, at the noon hour or office closing hour of a large building. An ejector should then be chosen of sufficient capacity to handle this rate of flow with at least 100 per cent margin of safety on one of the duplex units only. That is, either of the duplex units should be able to handle the maximum probable flow when operating one-half of the time. The adoption of this scheme provides for long periods of rest for the pumps and driving motors during most of the day, for double the normal capacity in emergencies even if one of the duplex units is out of commission, and for quadruple the normal capacity when the complete duplex unit is in the operative condition in which it normally should be. These factors are none too conservative when apparatus or merchandise of value is located in areas served by the ejector.

The determination of the head against which the ejector must discharge is relatively simple, this head being merely the static lift from the elevation of the bottom of the ejector pit to the invert of the street sewer plus the friction loss through the discharge piping. This loss should be calculated on the assumption that both units are discharging simultaneously, and it is advisable to use relatively large discharge piping to guard against excessive friction when partially clogged. If in the preliminary layout of a building it becomes apparent that an ejector will be required for at least a slight lift, it is generally unnecessary to devote much study to keeping this lift to as low a figure as possible—the fact that an ejector is required at all settles at once that the necessary space must be provided and the consequent initial investment must be faced; whereas the increased operating cost for a few feet additional lift is practically negligible and should not be allowed to influence the considerations of best possible location and arrangement of the ejector and its pit.

On the question of space requirements, it may be stated that except for buildings of almost mammoth size, a duplex electric ejector can be installed either in a circular pit 8 feet in diameter or a rectangular pit 8 feet by 6 feet; the depth of pit must be 4 feet lower than the invert of the sewage inlet. A duplex pneumatic ejector of comparable size can be installed in a circular pit 11 feet in diameter; the depth of the pit must be 6 feet below the invert of the sewage inlet. If air compressors with motors and starters in duplicate are required, additional floor space about 6 feet square is required.

With reference to the first cost of the ejectors alone, exclusive of pits, foundations, piping and erection, the purchase price is about the same for both types. Where compressed air is not available, and it is necessary to purchase air compressors to operate the pneumatic type, the total cost of this

type may exceed that of the electric type. The extra cost of installation, including excavation and concrete work for the pneumatic type, will be apparent from the comparative pit dimensions given in the preceding paragraph.

In the consideration of operating cost it is obvious that the electric method in which the mechanical power of the electric motor is applied directly to ejecting the sewage, is cheaper than the pneumatic method in which the mechanical power of the motor must first be applied to the compression of air, after which the air ejects the sewage.

A discussion of this subject would not be complete without reference at least to the condition which exists in many large buildings where valuable property is located far below the street level. It is at once obvious that a break in a water pipe, sprinkler pipe or hose system of large complications in the vicinity might be the means of permitting large quantities of water to enter such a building with attendant damage to whatever property might be below the street level. In such instances it is frequently advisable to install a pump of some sort. Whether it be an ejecting type or simple hose pump, may readily be determined by the conditions which will care for the maximum amount of water that may enter the premises. In one of our large cities there is a basement in which some valuable printing machinery is located, and as an item of insurance alone the owners of the building installed a pump having a discharge capacity of 1,000 gallons per minute. The cost of this installation, of course, was large, but the cost was not to be compared with the damage which might be caused by one flood in the basement.

The architect in performing his full duty to his client cannot afford to overlook any possible contingency which may later develop into serious trouble, and where the case is properly presented to the owner the average man is more ready to pay for an installation which is an insurance against possible difficulty than to adopt the "take a chance" attitude.

It is not the function of this article to attempt to decide for the architect the type of installation to adopt, as there are such a multiplicity of factors entering into the consideration and such a great variety of conditions existing locally in certain types of buildings that each case must be considered individually. Both types of ejectors have proven through years of service their entire reliability, which, after all, is the main factor of practical interest, and it is assumed that the principal consideration of the different features herein mentioned, as well as the many other features which will readily suggest themselves to any one interested, will lead to a proper selection.

Concrete Oil Tanks — I. Their Construction

By JOHN H. HESSION

Assoc. Mem. American Society of Civil Engineers

RAPIDLY we are approaching the widespread use of oil as a fuel in place of coal. At the present time this is particularly true in industrial plants. Here large heating units are employed which, when converted to oil burning, effect substantial economies over coal. Conversions are being extended gradually to smaller installations, such as for theaters, apartment houses and residences, so that while the problem of oil burning equipment heretofore has been principally for the consideration of the industrial engineer, the architect must now acquaint himself with its details.

Oil as a fuel found its first use more than a generation ago in the form of a by-product at the refineries of the oil companies. Gradually the high efficiency of fuel oil over coal was realized in the industries, so that just before the war its use was not uncommon. With the advent of the war, due to transportation difficulties and other reasons, the coal supply was entirely insufficient. This acute situation gave sudden impetus to the turn from coal to oil, and since then the use of oil as fuel has grown to tremendous proportions.

In the beginning steel tanks were used for the storage of oil, and continued to be the most common form of tank until the war. They were usually erected above ground, as there was danger of corrosion under ground, as well as difficulty in detecting small leaks. Repairs, too, were expensive. Concrete containers were used to a limited extent up to this time with varying success. When the war was upon us, it became extremely difficult to obtain steel, yet the demand for oil tanks increased greatly. The result was concrete tanks came rapidly into use, until at the present time more fuel oil tanks are being constructed of concrete than of steel. Among the reasons for this are: first, some doubt existed as to whether concrete could be made oil-tight, but this doubt is now dispelled, especially in the case of the heavier oils; second, steel tanks as above stated are not satisfactory when buried, whereas if built above ground there is a substantial loss from evaporation through the joints of the plates, particularly in the summer. The fire hazard in this case is great, as the recent \$5,000,000 oil fire at Long Island City attests; third, inasmuch as concrete tanks can be made tight they can safely be buried under the frost line where the temperature changes are slight, thus eliminating large temperature stresses in the structure and reducing evaporation to a negligible

quantity. Furthermore, the contents of the tank under ground is removed from the danger of fire either from lightning or nearby buildings. This burial of tanks is often insisted upon by insurance companies.

SIZE. This depends upon the quantity of oil used daily and the number of days' supply desired. Ordinarily a sixty to ninety days' supply suffices, though a single month's requirements may be sufficient in small installation where ready deliveries are made by truck. Some of the large cities specifically limit the quantity that may be stored. It is well to keep the tank as small as possible, in order to eliminate joints in the concrete. If joints are necessary, their number should be reduced to a minimum, since they offer serious planes of weakness to seepage.

Several small tanks are preferable to a single large one, as a fire in one of a group will consume only a portion of the whole supply, while a fire in a single tank might mean a total loss.

SHAPE. Where practicable, it is advisable to use circular tanks to eliminate as far as possible complex stresses in the walls and to reduce the quantity of concrete. Where the tanks are to hold small quantities of oil, it is often necessary to place them where the circular shape would be impracticable and it becomes necessary to use a rectangular shape. Frequently on large installations the tanks must be crowded into a given space, thereby requiring them to be of rectangular or many-sided shape. In such cases extra attention should be given to caring for the bending stresses in the walls at the junction of the floor and roof as well as midway between. A circular wall is better able to adjust itself without appreciable cracking to temperature changes than is a rectangular wall.

CONCRETE. The concrete must be much more carefully attended to than in ordinary building construction so as to insure as perfect work as possible. Where feasible, tests should be made to obtain from the ingredients the densest possible mix. The broken stone or gravel should vary from 1 inch in diameter to $\frac{1}{4}$ inch, and must be hard and clean. Aggregate larger than 1 inch may give trouble when poured by failure to permit the flow of concrete around the reinforcement. Sand should pass a $\frac{1}{4}$ -inch screen and be graded down to 100 mesh, not more than 5 per cent passing the latter. It must contain no organic matter and its clay or loam contents must not exceed 3 per cent. The cement should be a standard brand

of Portland cement, subjected to the usual laboratory tests.

Mix. Satisfactory results have been secured with 1:2:4 concrete, but to insure more density 1:1½:3 is recommended with an addition of 8 pounds of hydrated lime to each bag of cement. The lime gives plasticity to the mass—invaluable in thoroughly filling the forms. A 1:1:2 mix is likely to be difficult to handle in placing, due to its viscosity. The amount of water must be very carefully watched, since too much water is as detrimental as too little. By doubling the correct quantity of water the strength of the concrete has been known to be reduced to less than one-third. The water contents is right when the mix is plastic and yet, on depositing, little or no free water appears on top, that is, the consistency should be "quaky." Having once secured the correct quantity of water, it should thereafter be carefully measured for each batch.

While one-minute mixing has been the rule on most other concrete work, this is not sufficient for tanks. Additional mixing appreciably increases the density and therefore the strength of concrete. Furthermore, the amount of concrete in these tanks is comparatively small, so that extra time for mixing is not a serious delay. Two minutes yield excellent results on mixing, this time being measured from the moment all the ingredients are introduced into the mixer.

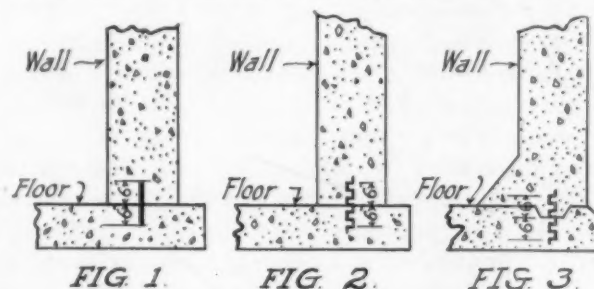
FORMS. Forms must be thoroughly substantial and unyielding, as any distortion after initial set in the concrete takes place seriously affects the tightness of the tank and the strength of the concrete. Surfaced lumber, tongued and grooved, should be used.

The wall forms are more difficult to construct properly than the balance of the forming, and yet they are the most important. Every care should be taken to secure tightness, since even a small crack will allow the fine ingredients of the concrete to flow away. The resultant concrete will then be "honey-combed," thereby offering ready passage for oil leakage. A mistake sometimes made is to use heavy rods to keep the inside forms and the outside forms for the walls properly spaced. For ordinary building work these rods will serve admirably, but where water or oil has to be resisted, they form a serious obstacle. Oil and water have a tendency to find their way along the surface of the metal, and a leak of this kind is difficult to tighten properly. The best way to stop such leakage is to cut the rod off about an inch inside the face of the concrete—a difficult matter in itself, and then to fill in the cutting thus made with an oil-tight plaster. The use of twisted wires for the same reason should be avoided if

possible; but if necessary to use them, they should be cut off similarly to the heavy rods.

PLACING CONCRETE. This feature is one of great importance. When concrete is carried even a short distance from the mixer, the coarse aggregates separate from the fine. When the mass is dumped, it therefore needs careful puddling to redistribute the ingredients and to squeeze out entrapped air. Insistence on good spading is most necessary. Small batches frequently dumped are preferable to occasional large ones, owing to the advantage of readier puddling.

JOINTS. The ideal tank would have no joints, but practical difficulties usually do not permit such construction. On small tanks it is possible to have but one joint between the roof and walls by suspending the inside wall forms. The larger tanks require in addition to this joint another between the floor and wall, though it is possible to eliminate the latter joint by using sliding wall forms. Such forms are expensive and most contractors do not possess them. The floor must be cast monolithically, as likewise the roof. Walls should be poured continuously from floor to roof, to avoid a horizontal or a vertical joint. This can be done by building up the walls in one or two foot layers, the top layer being deposited before initial set has taken place in the lower layer. Should the lower layer set too hard, its surface must be thoroughly cleaned and roughened, and a 1:2 mortar applied just before the pouring of concrete is resumed. This procedure should be followed at the floor and roof joints of the wall, where the concrete has had opportunity to harden before renewal of pouring.

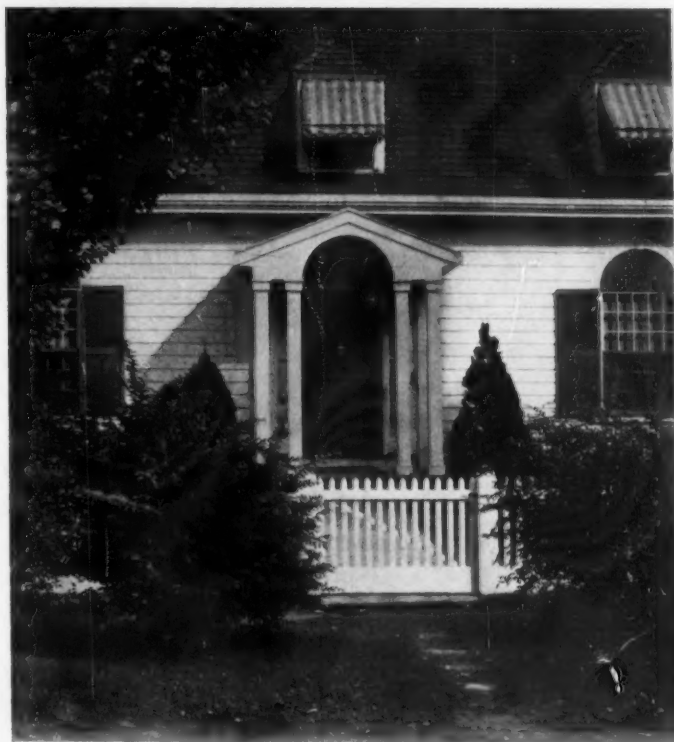
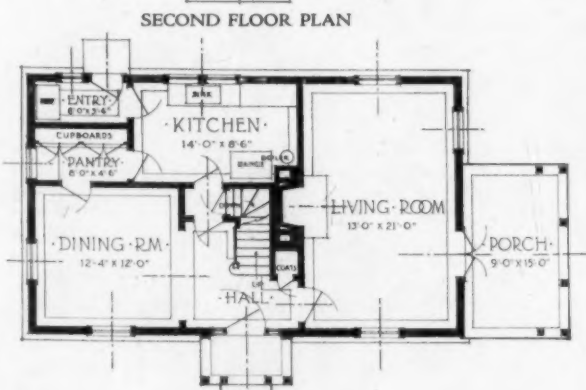
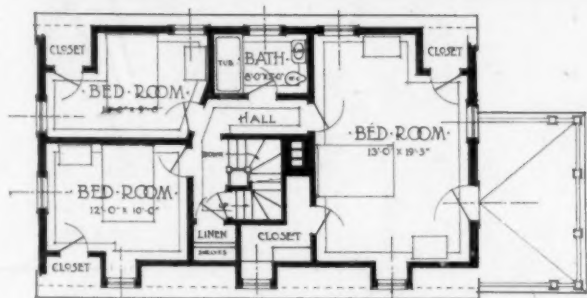


As a special precaution for obtaining a tight joint at the junction of the floor and walls it is well to use a metal strip about 12 inches wide, embedded 6 inches in the floor and 6 inches in the wall, as shown in Fig. 1. The laps of these strips should preferably be riveted. A further modification in lieu of plain metal is the use of a much bent strip as indicated in Fig. 2. Such an arrangement requires the oil to travel a longer distance than is required with flat metal. In addition to the metal dam the width of joint should be increased by bringing out the base on an angle (Fig. 3) and by slotting the wall into the floor.

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EDITORIAL COMMENT

ARCHITECTS AND BIG BRIDGES

AS a part of post-war expansion the construction of three bridges has been authorized in Pittsburgh in which Allegheny County and the city have associated interests. The city of Pittsburgh has an active and competent Art Commission that is keenly appreciative of the value of well designed bridges, but owing to its limited power it has no jurisdiction over county structures. The bridges, however, are an intimate part of the city, and the Commission after diligent effort was fortunate in interesting the county authorities in its aims, with the result that some assurance was given that the bridges to be erected would have architectural consideration, and evidence of this is now had in the appointment of architects to design the structures.

Our contemporary, *The Engineering News-Record*, expresses surprise at these appointments and calls into question the advisability of the procedure as a matter of public policy. *The News-Record* would be quite content to let the matter pass if the architects were "merely consultants on aesthetic features," but to entrust matters of construction to them appears a menace to the public safety.

It is not our intention to advocate the placing of architects in sole charge of bridge design—in fact, it is our opinion that the most satisfactory results can be obtained by the joint efforts of architect and engineer working with equal responsibility, and our understanding of the situation in Pittsburgh is that this condition exists there. The responsibility for the engineering features of these bridges is invested in the county engineer in charge of bridge construction, and if no independent engineer has been named it may be assumed that the county engineer will perform his functions to a satisfactory degree, and that the appointment of architects will not interfere with the exercise of his usual jurisdiction and authority.

Bridges are not the only structures in which public safety is a factor, nor is it only in them that construction must be given paramount consideration. If architects can only be permitted to consult on æsthetic matters in bridge design, surely terrific responsibilities rest somewhere for permitting them to be in sole charge of the design and construction of thousands of buildings erected annually. Is not the public safety a matter of some concern to the architect who is responsible for the modern thirty-story office building or the auditorium seating 5,000 people?

We do not feel that this reflection of the attitude of the engineering profession toward the responsibility of architects is a true one. The respective professions have made rapid strides in recent years in reaching a common understanding of their particular functions and the results have been mea-

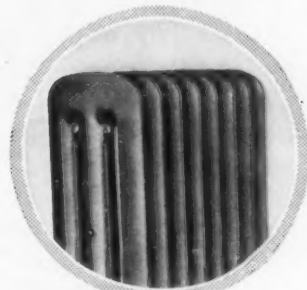
surably greater. A serious consideration of this question must establish the fact that architects are fully as responsible to the public in matters of safety as engineers. The big consideration is that the real and most important function of the architect is mistakenly or not at all understood by engineers and the great body of the public. An architectural problem to them means largely a matter of surface decoration—it is not realized that the fundamentals of any building problem are best solved from the architect's point of view. Before the structural features can be considered it is necessary that a scheme be evolved which will meet the conditions imposed. It is here that the architect renders the greatest service.

In the case of bridges over important waterways, there are many conditions governing design that are fixed by governmental and other regulations. The height of span above mean water level, the percentage of the river's width the supporting piers may occupy, the width of roadway and other factors are predetermined and must be accepted by whomever is entrusted with the problem. The architect is peculiarly qualified to co-relate these conditions with the equally vital matters of approach, relation to existing buildings and the importance and beauty a bridge should possess as a civic feature, and evolve a solution that will meet the larger aspect of the problem. Engineering features are prescribed within definite limits and are properly dependent upon the bigger item, the conception of the scheme, for it is that that will determine the usefulness of the bridge as a traffic artery and its value as a civic feature.

It is only recently that the Municipal Art Committee of the Chicago Chapter of the American Institute of Architects has been of invaluable service to its city in this same connection. Plans had been decided upon for a bridge over the Chicago River that would have been entirely out of keeping with the enlightened stand the city has taken with reference to civic extensions. This design contemplated a pair of huge steel towers and was approved on the theory that other types would not be available because of legal and other complications. The Chapter's Committee gave the matter extensive study and was able to propose and have adopted a type of bascule bridge which not only serves the needs of the river from the standpoint of navigation in a better manner, but also enables the straightening of the river which is contemplated at some future time, to be done without the necessity of a new bridge. This public spirited work has been instrumental in preventing the erection of a very unfortunate structure and assures a bridge that will be worthy of the city when its extensive plans have been brought to maturity.

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CATALOG REVIEWS

GLADDING, McBEAN & Co., San Francisco and Los Angeles, Calif. "Latin Tiles" (9½ x 12½ ins.). 60 pp.

A most interesting catalog is the above firm's recent collection of plates illustrating examples of its executed work in roofing tile. As a pictorial issue it is very much in advance of the usual catalog, with its exceedingly fine cuts of architectural subjects using Latin Tiles. The construction details peculiar to the Cordova, Mission, American, Spanish, Italian and French tile manufactured by Gladding, McBean & Co., are amply shown on separate pages. Besides the paragraph relating to each page illustration there is a specimen of tile roofing specification, an historical introduction and a clever frontispiece in full color.

THE INTERNATIONAL CASEMENT COMPANY, INC., Jamestown, N. Y. "International Casements for Banks and Public Buildings" (8½ x 11 ins.). 24 pp.

This booklet should prove of value to the designer as it is practically a series of architects' drawings of bank windows that have been very successfully carried out by The International Casement Co., Inc. Various examples of this type are shown on facing pages, allowing for a photograph at the left and a scale elevation with large sections at the right. The details are carefully made, materials clearly shown, and all embellishment minutely drawn, while suggestions of interest to the architect fill the concluding pages. This little publication is tastefully arranged and thoughtfully prepared.

PROFESSIONAL NOTICES

Messrs. Eugene T. Benham and William J. Richards announce the opening of offices at 214 East State street, Columbus, Ohio, under the firm name of Benham & Richards, for the general practice of architecture.

Mr. Laurence F. Peck, architect, announces the temporary removal of his office from 599 Fifth avenue to The Architects' Building, 101 Park avenue, New York.

Mr. Raymond B. Spencer, architect, Memphis, Tenn., has opened a branch office in the Blytheville Bank Building, Blytheville, Ark., under the management of Mr. Claude Northern. Manufacturers' samples requested.

Messrs. Hallett & Pratt, architects and engineers, Richmond, Va., announce the opening of a branch office at 1105 American Building, Baltimore, Md. Manufacturers' samples and catalogs requested.

Mr. Scott Lehman and Mr. Wm. G. Wuehrmann have formed a partnership for the practice of architecture, with offices at 404 Reynolds Building, El Paso, Tex. Manufacturers' samples and catalogs requested.

Mr. I. L. Wright and Mr. Slack W. Winburn have formed a partnership for the practice of architecture with offices in the A. V. Scott Building, Idaho Falls, Ida. Manufacturers' samples and catalogs requested.

Mr. Hawley W. Morton, formerly of the firm of Morton & West, will resume the practice of architecture at 308 Boylston street, Boston, Mass.

Mr. Chester E. Wolfley and Mr. Arthur G. Eliel announce the formation of a partnership for the practice of architecture under the firm name of Wolfley & Eliel, with offices at 610 Stewart Building, Rockford, Ill. Manufacturers' catalogs and samples requested.

Mr. Donald C. Bollard announces the opening of his office for the practice of architecture at 303 McCague Building, Omaha, Neb. Manufacturers' samples and catalogs requested.

Mr. William E. Haugaard announces the opening of offices at 185 Madison avenue, New York City, for the practice of architecture. Mr. Charles H. Mills, architect, of Wilmington, Del., associate. Manufacturers' samples and catalogs requested.

Messrs. Mann & MacNeille, architects and construction Engineers, New York City, announce the opening of a branch office in the Book Building, Detroit, Mich. This office has been opened to facilitate the work of industrial housing, city planning, municipal expansion, general architectural design and construction throughout the Middle West.

Thomas W. Ludlow, formerly of the faculty of the School of Architecture in McGill University, Montreal, has been appointed Assistant Professor of Design in the School of Architecture at the Carnegie Institute of Technology. Professor Ludlow was recently discharged from the Canadian Army. He is a graduate of Columbia University and has studied architecture at L'Ecole des Beaux Arts, Paris.

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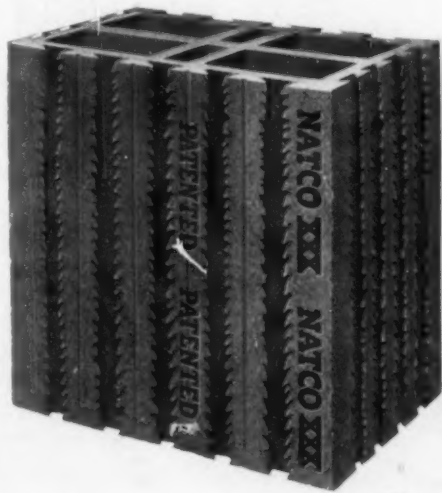


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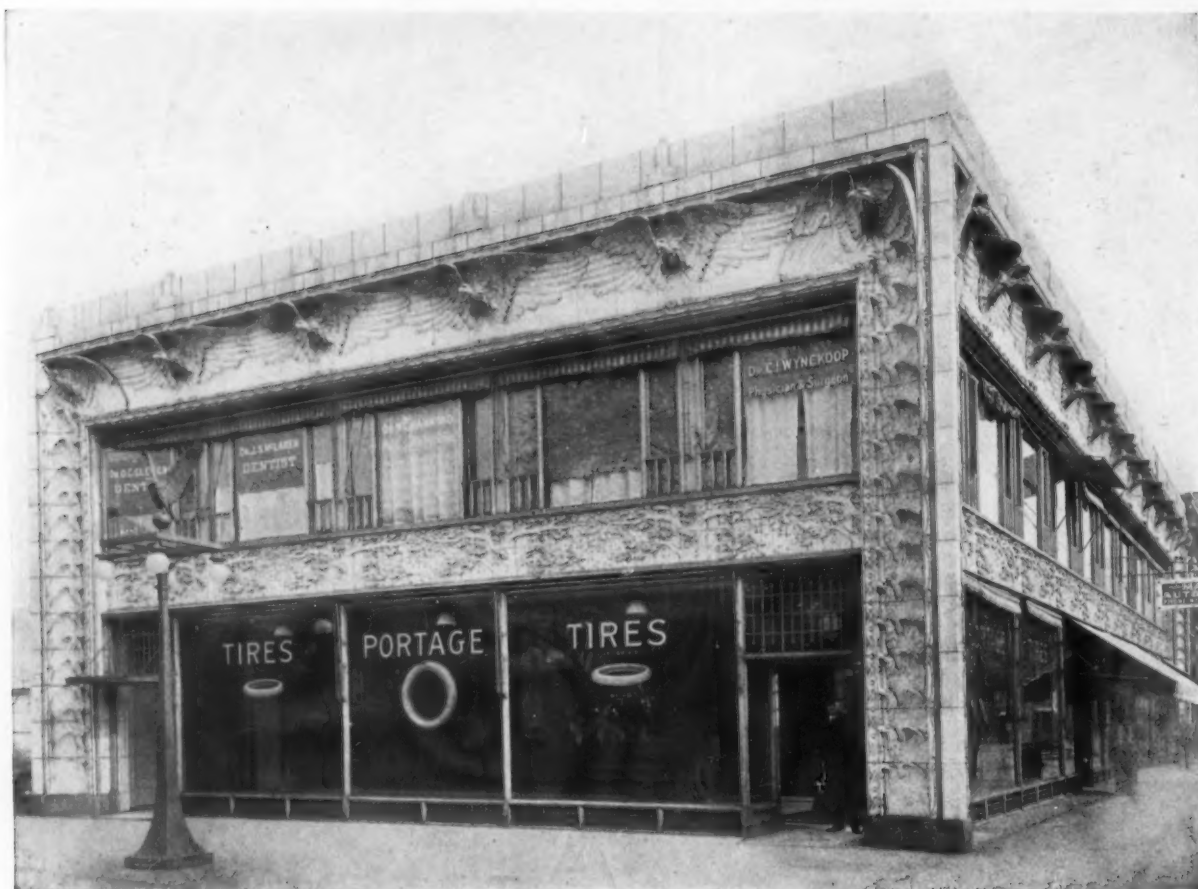
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100,000	4 x 4 x 2	Flashed Oriental	1,000,000 Shapes for Fireplaces, Floors and Inserts		



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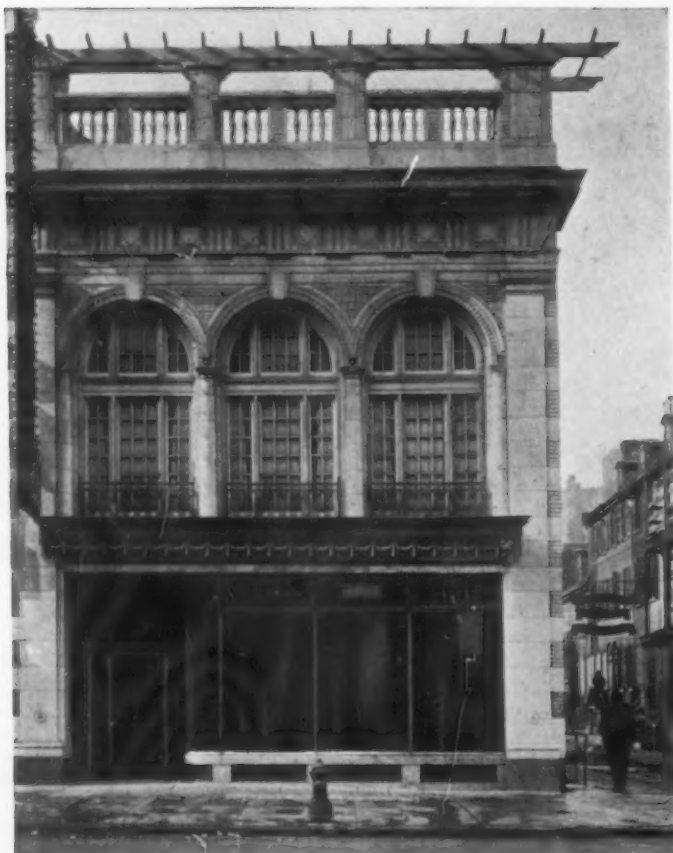
¶ Whatever name you may call it by—and that may depend largely upon the section of the country in which you live—we refer to that part of the residence which is “outdoors” and “indoors” at the same time.

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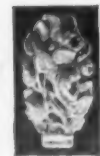
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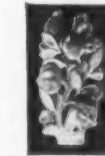
3143-Y



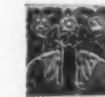
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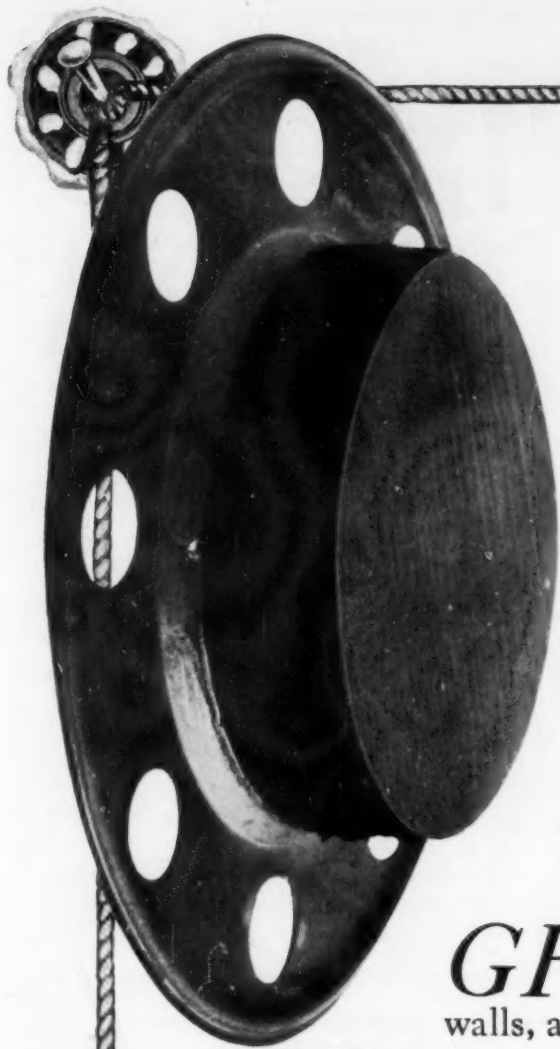
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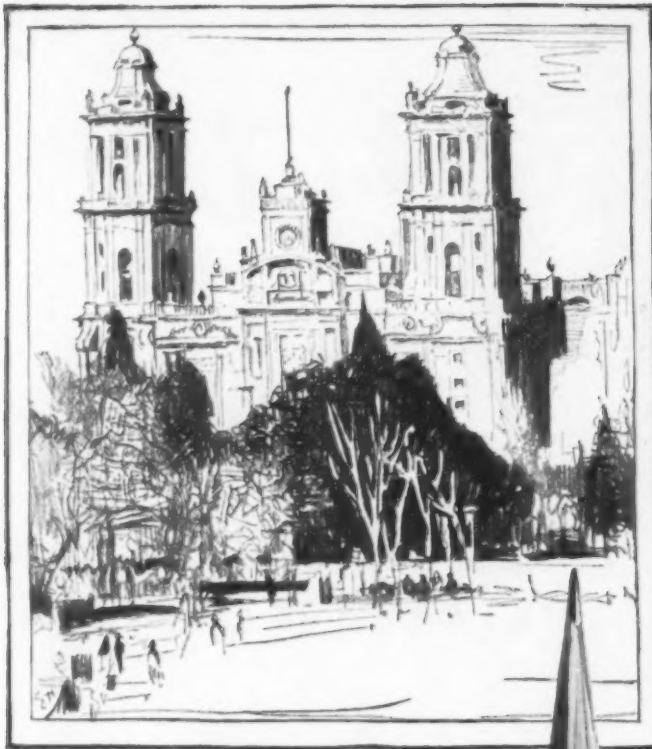
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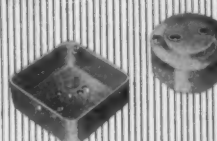
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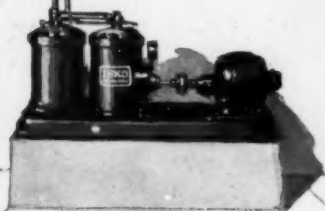
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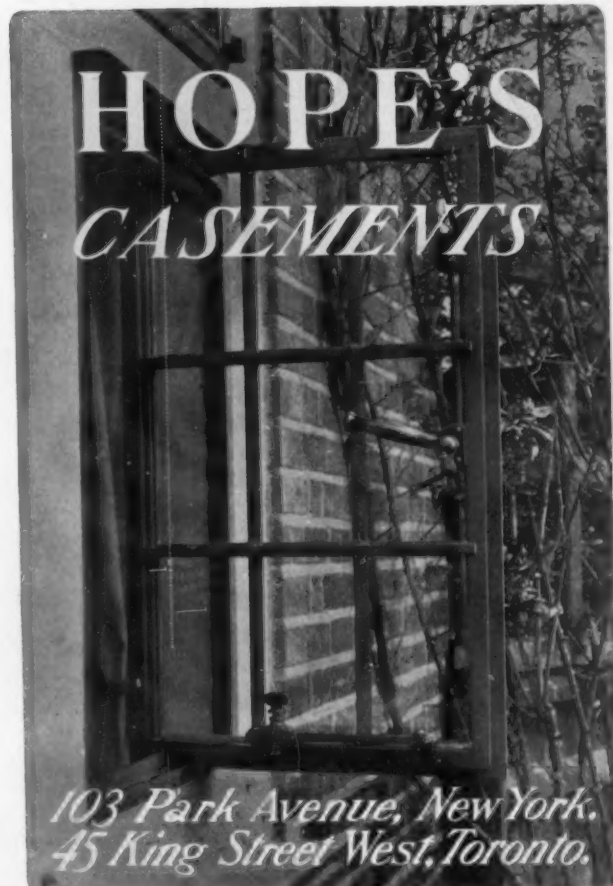
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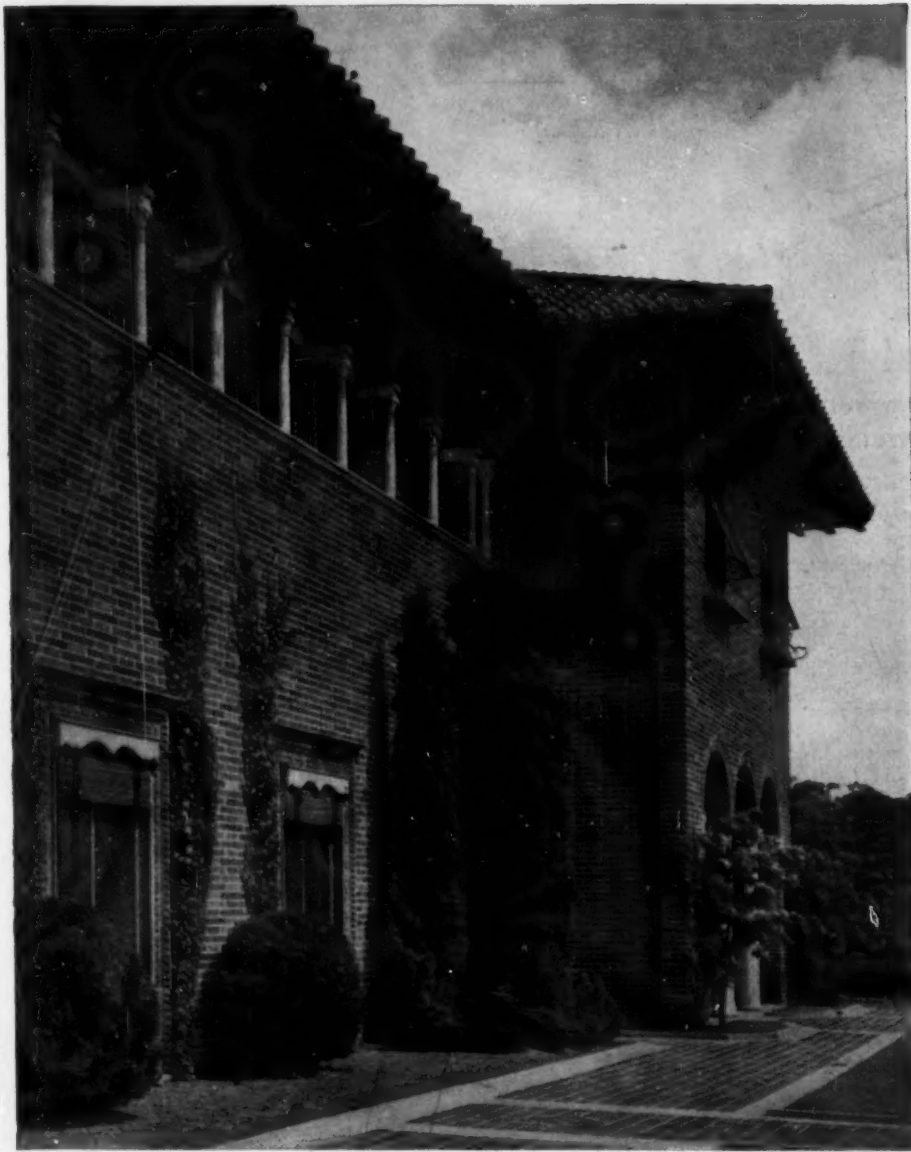
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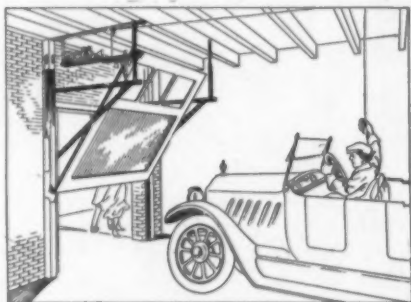
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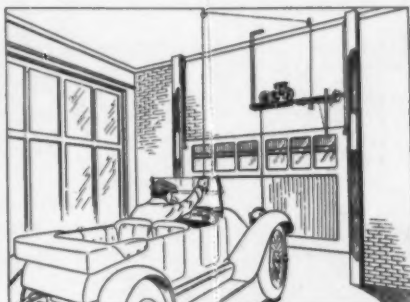
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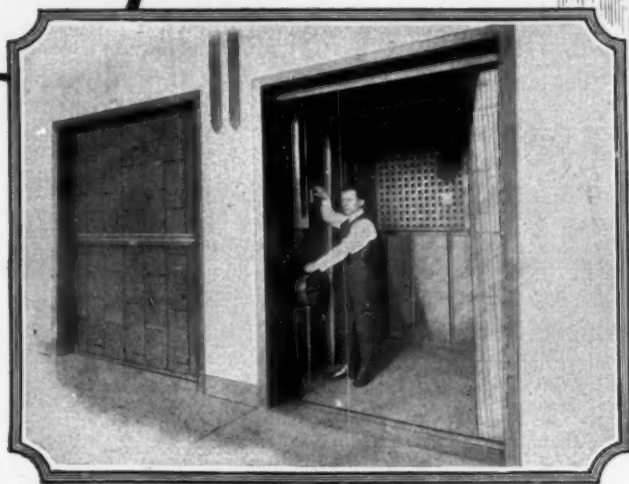
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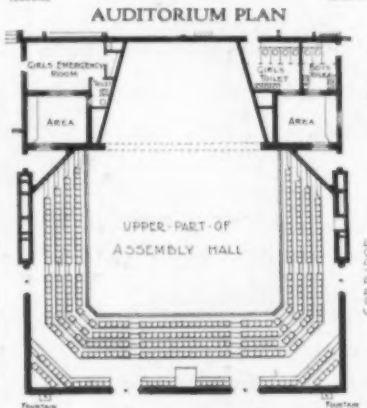
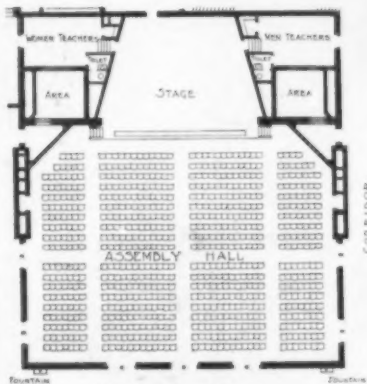
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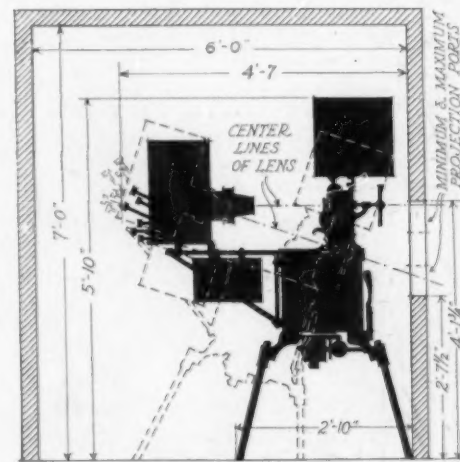
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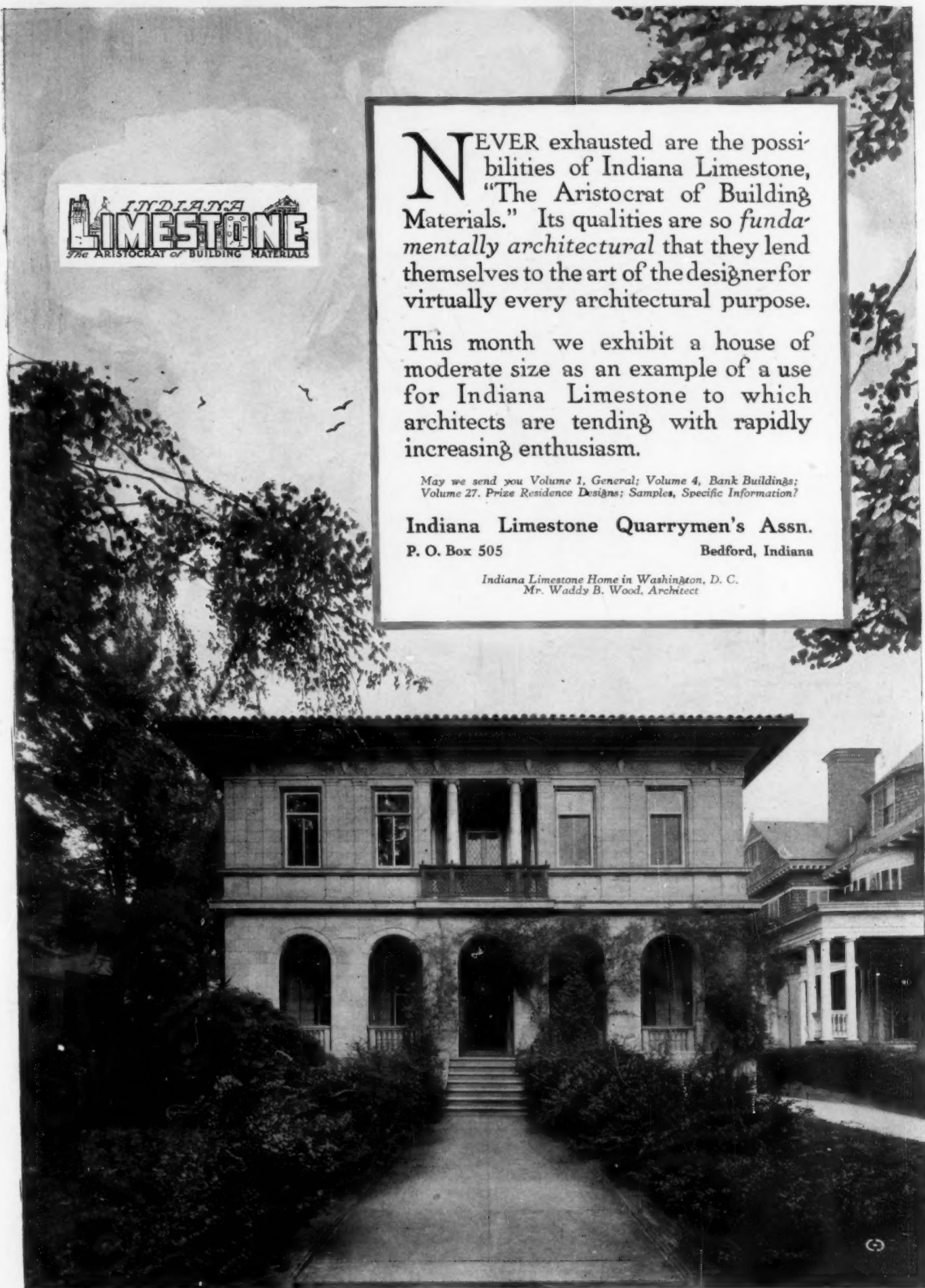
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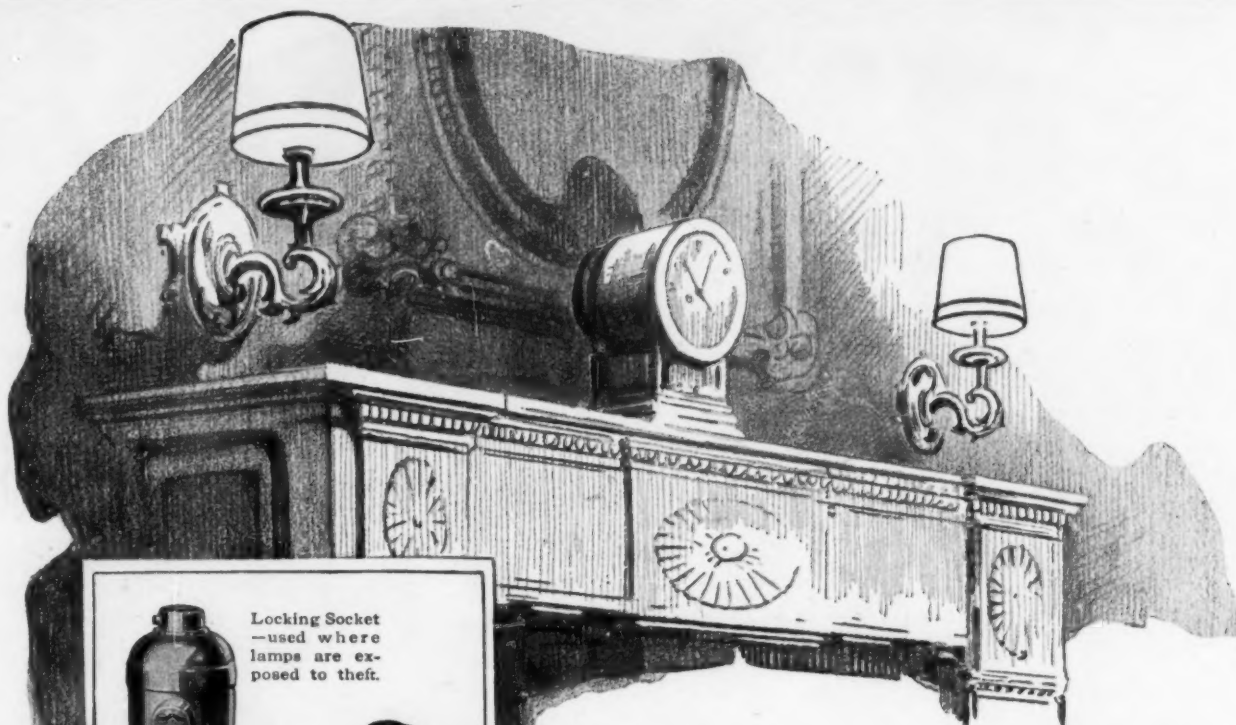
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DETROIT STORE, 73 W. CONGRESS ST.

T-12



Locking Socket
—used where
lamps are ex-
posed to theft.



Push Button Socket
—another convenient
type



Key Socket—
for use on any
type of fixture



Pull Chain Socket
—for maximum
convenience

Lamp Sockets are an Important Part of the Electrical Installation

EVERY Mazda Lamp must have a fitting to hold it and this fitting must be of a given size and design.

These fittings are technically known as sockets. Sockets are made with shells of metal, porcelain, or compound, depending upon the environment or decorative scheme in which they are to be placed. They are also provided with key or with pull chain for turning the light on or off; or without any integral means of control, this type for use where a separate switch is installed. They are also made in locking type to prevent theft of lamps or current.

Weather-proof sockets are recommended for outdoor use or where adverse conditions preclude the use of other types. A few of the many styles of G-E sockets are illustrated on this page.

G-E RELIABLE WIRING DEVICES

*can be furnished by any reputable
electrical contractor*

The name General Electric Company on an electrical device is a guarantee of quality backed by over a quarter-century's experience in the generation, transmission, distribution and application of electricity.

General Electric Company
General Office Schenectady, N.Y. Sales Offices in all large cities.



7 reasons why Brascolite is the perfect lighting fixture

- 1—Brascolite Improved Supporting Tripod—simplest device for attaching to any kind of electric outlet.
- 2—Brascolite Socket, made of porcelain with protected terminals—no wire splicing or electric troubles.
- 3—Brascolite Pull Switch of new toggle construction in insulating material. 660 watt capacity.
- 4—Brascolite Flat Reflector Plane made of white porcelain on steel—positively will not discolor.
- 5—Brascolite Spindles hold reflector-base flush with the ceiling and also support the bowl. Adjustable to correctly position the bowl for controlling every ray of light, thus insuring uniform light distribution.
- 6—Scientific configuration of the white glass bowl thoroughly breaks up the intense white light and softens it by diffusion. This principle has made Brascolite the ideal light for eye-health and comfort exceeding in efficiency that of any other light diffusing fixture in the world.
- 7—Ventilation upward through the hole assures long lamp life and least accumulation of dust.

Brascolite is the largest selling Lighting Fixture in the world

No matter how large or how small your requirements, Brascolite will meet your need perfectly—there's a Brascolite for every purpose.

15,000 Electrical Dealers sell Brascolite. Our Engineering Department is at your service and will gladly make calculations or give helpful advice concerning any requirements.

BRASCOLITE

LUMINOUS UNIT COMPANY

Division of the St. Louis Brass Manufacturing Co., St. Louis, U. S. A.

Largest Manufacturers of Lighting Fixtures

Branch Offices: New York Chicago Philadelphia Boston San Francisco Cincinnati Minneapolis Atlanta

Canadian Distributors: Northern Electric Co., Ltd.

At this Stage—
Installing Woodwork



Money can be saved, clients
 thoroughly satisfied and builders prac-
 tically helped by the selection of



*Used for white enamel throughout in this home at
 West Newton, Massachusetts*

Arkansas Soft Pine

Satin-like Interior Trim

Costing notably less than rarer woods, it has a definite non-resinous character and tough fibre, insuring against discoloration of white enamel, or raised grain under enamel or stain.

It is the perfect wood for casing, base and mouldings in houses of the better sort, where an exceptionally fine satin-like surface is desired.

Invariably successful under every color treatment. Our samples and booklet tell how and why. Sent on request.

*ARKANSAS SOFT PINE Is
 Trade Marked and Sold by
 Dealers East of the Rockies.*

Arkansas Soft Pine Bureau

1251 Boyle Building, Little Rock, Arkansas



Architects Can Now Serve the Builder of the Small Home

Architects responsible for the "best houses" are rarely afforded the opportunity to design small houses for individual clients.

Therefore, we welcomed the opportunity offered us by the Curtis Companies to place whatever ability we may possess at the disposal of the small home builder.

In this work we have drawn from every source for our material. Architects have co-operated with us and furnished us with features that may have developed.

Basic plans were prepared and then developed in four expressions—Colonial, English, Southern, and Western.

Woodwork suited to each of the four expressions was worked out in detail and these designs are manufactured by the Curtis Companies in standard sizes.

Some may question the advisability of "standardization." From my point of view, it does not matter that forms are standard so long as they are good forms.

It is my feeling that, with a source of standard forms of accepted designs to draw upon, architects will be able to give to smaller homes the time and thought necessary to their development along approved architectural lines.

Better give the small home builder a home that is good by using standard sizes and designs— which an architect can afford to do as his detailing is eliminated—than to leave that home builder to his own unskilled planning.

Frederick Lee Ackerman
Trowbridge & Ackerman, New York

Complete information regarding the work Mr. Ackerman has done will be sent gladly upon request.

1866
CURTIS
WOODWORK
"The Permanent Furniture for Your Home"

CURTIS SERVICE BUREAU
Clinton, Iowa

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EASTERN OFFICES AT PITTSBURGH AND WASHINGTON

The makers of CURTIS Woodwork guarantee complete satisfaction to its users

"We're not satisfied unless you are"



**THE VOGUE OF
METAL FURNITURE**

The dignity and beauty of well-designed Metal Furniture give to it an appropriateness, for certain decorative requirements, not equaled by any other furniture style. Inspection by Dealers, Decorators and Architects is cordially invited.

A. H. NOTMAN & COMPANY
121-127 W. 27th Street NEW YORK
Selling Agents for John Miller & Co.

**Decorative Lamps and Mirrors,
Objects of Art, and new
Artistic Designs in
Metal Furniture**



Reproduction of Jacobean Paneling retaining the texture, color and design of the original

WE ARE EQUIPPED TO HANDLE EXPEDITIOUSLY A LIMITED NUMBER OF COMMISSIONS. INQUIRIES ARE SOLICITED.

SHERWIN & BERMAN, INC.

Architectural Woodwork, Special Furniture and Decorative Painting
405 EAST 4th STREET - - NEW YORK

LANS

ANTIQUES

New Importations

AMONG our newer importations are several important collections, including many fine examples of French and English Furniture, unusually desirable for their high artistic value and their antiquity.

Especially noteworthy are interesting specimens in Adam Satinwood, Chippendale and Queen Anne Furniture, Jacobean Tables and Chests, Louis XV and XVI Consoles, Commodes, Secretaires and Fauteuils.

Also some choice bits of old Glass, Chinaware, Needlework and Bric-a-brac for the unusual Holiday Gift.

Architects and Decorators

If you cannot visit our interesting galleries, write us your needs. In any case, register your name with us now to insure recognition when your patrons call upon us.

554 Madison Ave., New York
CORNER OF 55th STREET

BOOK OF DESIGNS for SMALL HOUSES

THIS book contains forty-five designs showing careful study of the small house problem. They are planned for lots having a frontage of 30 feet and estimated to be of moderate cost. The material for which they are designed to be executed in is texture-face hollow tile, requiring no outside stucco coating. Each design is illustrated with pen and ink perspective and complete floor plans. The book is further amplified by practical illustrated articles and offers many suggestions of value at this time when the small house problem is receiving much attention.

Price Fifty Cents, Postpaid

Rogers and Manson Company
85 WATER STREET BOSTON, MASS.

Leave Room for a Pipe Organ in Drawing Your Plans

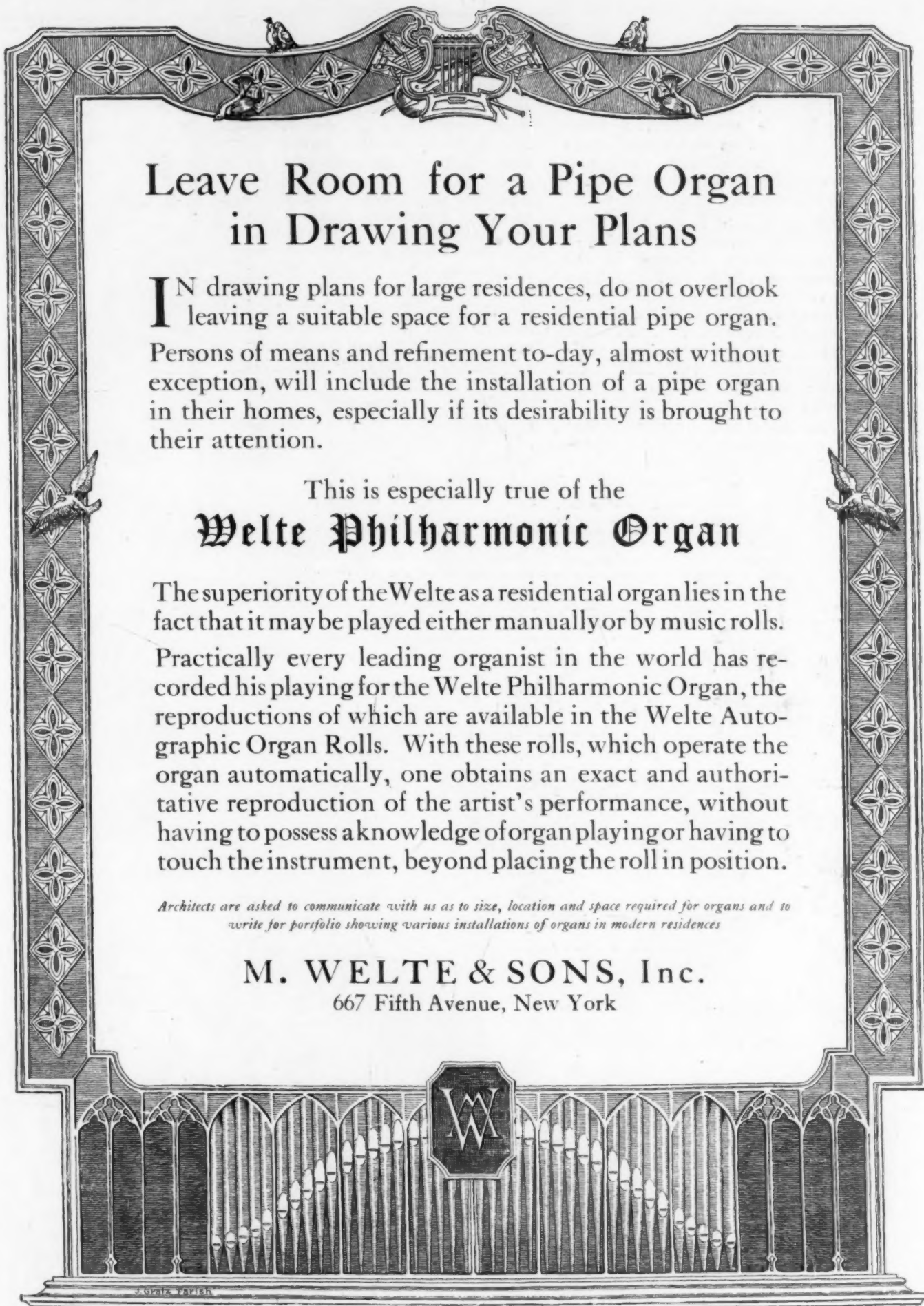
IN drawing plans for large residences, do not overlook leaving a suitable space for a residential pipe organ. Persons of means and refinement to-day, almost without exception, will include the installation of a pipe organ in their homes, especially if its desirability is brought to their attention.

This is especially true of the
Welte Philharmonic Organ

The superiority of the Welte as a residential organ lies in the fact that it may be played either manually or by music rolls. Practically every leading organist in the world has recorded his playing for the Welte Philharmonic Organ, the reproductions of which are available in the Welte Auto-graphic Organ Rolls. With these rolls, which operate the organ automatically, one obtains an exact and authoritative reproduction of the artist's performance, without having to possess a knowledge of organ playing or having to touch the instrument, beyond placing the roll in position.

Architects are asked to communicate with us as to size, location and space required for organs and to write for portfolio showing various installations of organs in modern residences

M. WELTE & SONS, Inc.
 667 Fifth Avenue, New York



THIS view of a bedroom leading into a sleeping porch demonstrates how well linoleum floors look when they are properly related to attractively arranged interiors.

The bedroom floor, with the graceful, vinelike design, is Armstrong's Carpet Inlaid Linoleum, Pattern 721. The rose-colored porch floor is Armstrong's Granite Linoleum, Pattern No. 1, and there are many other patterns equally well suited to the hangings, wall coverings and furniture.

This illustration shows but one of the many charming ef-

fects which the architect who likes to blaze a new trail can achieve through intelligent selection of an Armstrong's Linoleum floor to meet the requirements of good taste. In so doing he has the additional satisfaction of knowing that from every practical standpoint, linoleum will give his client good service. Laid right—with the linoleum cemented down firmly over a layer of heavy felt paper and then rubbed with a good floor wax—your client will have a beautifully polished floor, durable, economical, comfortable and easy to keep clean.

"ARMSTRONG'S LINOLEUM FLOORS"

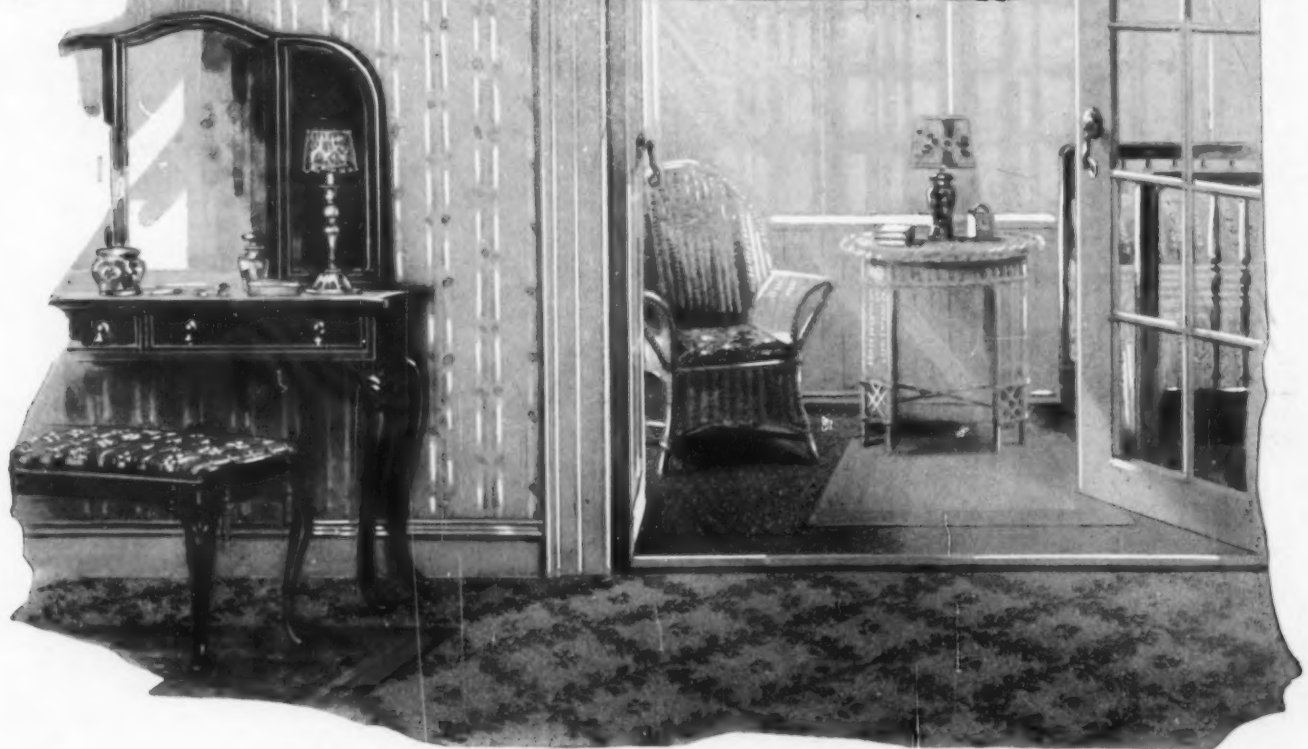
Plates showing a wide assortment of Armstrong patterns in actual colors are included in "Armstrong's Linoleum Floors," a convenient handbook for your files. This book also explains the approved methods of installing linoleum floors. A copy is yours for the asking.

Our Bureau of Interior Decoration will gladly submit samples and suggest patterns appropriate for any room you have under consideration, upon request.

Armstrong's Linoleum

For Every Room **(A)** in the House

Armstrong Cork Co., Linoleum Department
Lancaster, Pa.





VIEW OF ST. PAUL'S CHURCH AND THE BROADWAY STAGES, N.Y. 1831.

DUNCAN PHYFE, his FURNITURE and its APPROPRIATE SETTING

IN 1795, Duncan Phyfe, in his shop at 194 Fulton Street, New York—now the site of the mighty Hudson Terminal Building—made the first American furniture which achieved a real renown. He wrought personally his best pieces for a small and wealthy clientele; yet exquisite as they were his struggle for success was a hard one. Toward 1799 he was threatened with bankruptcy—and rescued from it by Mrs. Langdon, a daughter of John Jacob Astor.

Phyfe's insistence upon quality was the cause of many of his business troubles. He would use only the finest Cuban and Santo Domingan woods. His attitude was such that it caused the West Indian exporters to speak of their choicest timbers as "Duncan Phyfe"

logs, and to mark them with his initials. Phyfe is said to have paid as high as \$1,000 each for some of them.

His furniture is intimately associated with the charming interiors of the Adam-Sheraton period—a period that has inspired many of the Upholstery Silks produced by Cheney Brothers. And these silks in their design are in faithful keeping with the spirit and artistry of the Brothers Adam as well as that of their famous protégé, Angelica Kauffman.

Thus it is that those who are the fortunate inheritors of some lovely pieces of Duncan Phyfe, or who possess replicas of them, may find in Cheney Decorative and Upholstery Silks designs that will enhance the beauty of such prized possessions.

CHENEY SILKS

CHENEY BROTHERS

4th Avenue and 18th Street, New York



Varnish Investments

The item of varnish is an important investment for the home-builder, although he does not always realize it.

Architects know that the only profitable varnish investments are those that give as dividends the desired finish with a long-wearing period.

The specification writer does a client valuable service when he dictates the use of Berry Brothers' Varnishes, Enamels and Stains. They represent the most profitable investments that can be made in finishes.

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World's Largest Makers
Varnishes and Paint Specialties

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Walkerville, Ontario

(70)

Liquid Granite
FLOOR VARNISH

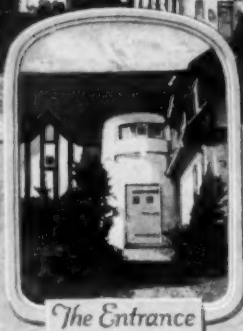
Luxeberry
WHITE ENAMEL

ATLAS-WHITE

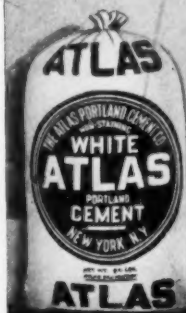


Owner:
John R. Henry, Great Neck, L. I.

Architect:
Frank J. Forester, New York



The Entrance



A HOME built with ATLAS Cement — stucco — gives you the economical advantages of permanent, fire-proof construction, requiring no painting and no repairs. Cement is so easily manipulated that it lends itself most readily to any desired contour, outline or structural form.

And ATLAS-WHITE for the finish coat—alone or mixed with color aggregates—produces and accentuates all desired color tones with an exactness and pleasing effect unsurpassed by any other materials.

Write our nearest office for our book
"Information for Home Builders"

THE ATLAS PORTLAND CEMENT COMPANY

NEW YORK Boston Philadelphia Savannah Dayton Minneapolis Des Moines St. Louis CHICAGO

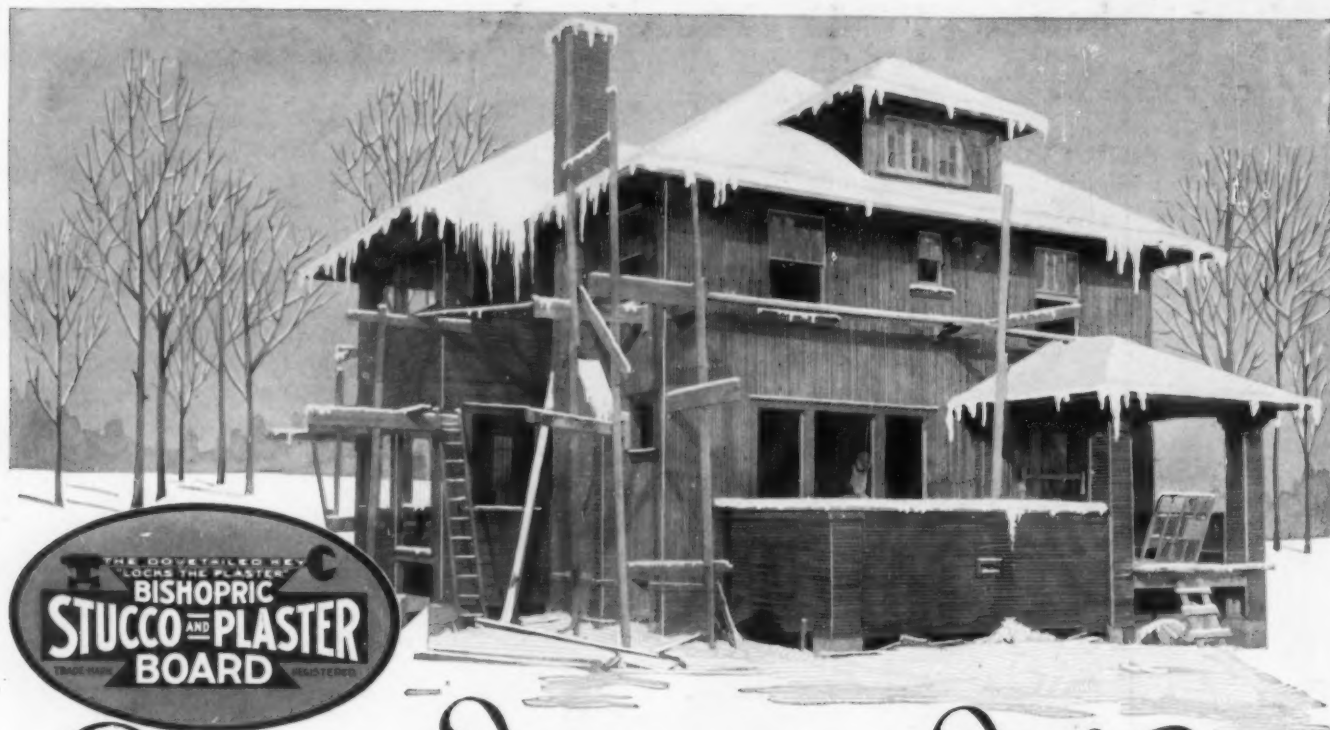
*This advertisement appeared in September "House and Garden,"
and October "Country Life in America," and "House Beautiful"*

NOT merely an advertisement of Atlas Cement; rather more an urge to build—pointing out where economies may be effected, how readily and satisfactorily the architect's recommendations may be followed, and how easily the dream of a new home may be materialized.

"The Standard by which all other makes are measured"

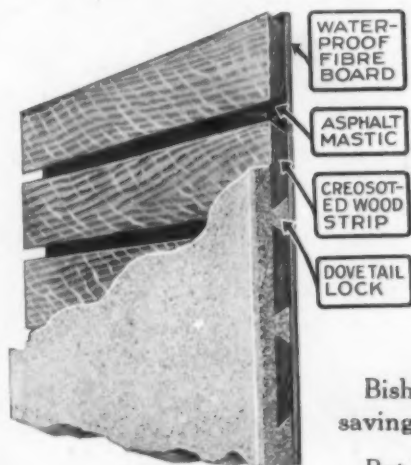
The Atlas Portland Cement Company

NEW YORK Boston Philadelphia Savannah Dayton Minneapolis Des Moines St. Louis CHICAGO



Erecting Homes in Winter

The above illustration shows the residence of William Mills, Cedar Rapids, Iowa, in course of construction. Designed by Architect William J. Brown. Stucco Contractor Charles R. Carpenter. Bishopric Stucco Board was used on this home.



We are ready to give you every service in connection with winter construction on Bishopric Board. Write us and get our Booklet.

DO NOT permit winter's interfering hand to halt your construction this year—apply Bishopric Stucco and Plaster Board to the studding or sheathing and proceed with the interior finishing.

Bishopric Board has in numerous instances, especially in the severe cold of the Northwest, stood exposed to the elements from fall to spring without disintegration or damage. In every instance the buildings have been ready for Stuccoing at the Architect's or Contractor's convenience.

If your clients are in urgent need of a place to live, they can occupy a Bishopric Board walled home in considerable comfort until the spring Stuccoing. The insulating qualities of this Board are decidedly extraordinary—it keeps a home extremely warm and dry. Dampness cannot penetrate the Asphalt Mastic and fibre-board, and the heavy wood strips are creosoted against exposure. Warmth and comfort are increased when it is used on the interior instead of wood lath.

Bishopric Board's economy should influence contracts at this time. The saving on the average home is about 25%. This is a big point to-day!

But best of all Bishopric Board is a Stucco background you can be sure of. You can apply the Stucco next spring and know that the walls will remain permanently beautiful and crackless—monuments to your judgment.

Tell your clients they can go ahead with their construction and specify Bishopric Board!

THE BISHOPRIC MANUFACTURING COMPANY
974 ESTE AVENUE

CINCINNATI, OHIO





THE EDITORS FORUM



INTER-PROFESSIONAL CONFERENCE

THE Post-War Committee, appointed by the Institute for the study of the architectural profession in the light of its own particular sphere and as it touches outside activities, has demonstrated in the calling of an Inter-Professional Conference that its research is not handicapped by narrow or selfish visions.

The great service that was rendered the Government by professional men during the war indicated the large power and influence this group possessed when it came together on a common ground. It was in recognition of this that the Post-War Committee instituted the Inter-Professional Conference to which representatives of all the professions were invited.

The conference was held in Detroit, Mich., November 28 and 29. A group of about one hundred men and women representing fourteen professions participated and effected a permanent organization. We shall present in the January issue an account of the proceedings prepared by the presiding officer, Mr. Robert D. Kohn.

PAN-AMERICAN CONGRESS

THE long planned conference of architects of both North and South America is announced for March 1, 1920, to be held at Montevideo in connection with an architectural exhibit of executed work or buildings under construction and students' designs from the various schools of architecture in American countries. The conference is intended to demonstrate the advancement of American architecture and to increase professional solidarity. Prizes will be awarded exhibitors in accordance with decisions of an International Jury composed of professors of architecture. All architects and faculties of architectural schools are invited to attend. Exhibits should reach the Organizing Committee at Montevideo by Feb. 10, 1920.

INTERIOR DECORATION

DECORATION of interiors is closely associated with architecture, and many architects have in recent years found it necessary to expand their interests to this field in order that they might have reasonable assurance that good architectural rooms were not garbled and spoiled by improper decoration. The editors of *THE FORUM* feel that interest in decoration is general, and they have, therefore, arranged to present in each of the forthcoming issues, articles on the subject. These articles will provide additional material over that published this year, and it is hoped *THE FORUM* will in that measure be performing a wider service.

THE TECHNOLOGY PLAN

INDICATIONS of a closer understanding between business interests and the great technical schools engaged in the training of experts have been steadily growing more numerous in the last few years. A special stimulus to more definite and tangible association of interests has been given the movement by the Massachusetts Institute of Technology in its recent announcement of its intention of giving direct service to the industries for a stipulated retaining fee. The Institute in common with other schools has need for additional funds to provide more nearly adequate salaries for the members of its instructing staff. A portion of the money needed will be available through a gift of \$4,000,000, conditional, however, on a like sum being raised by the school by Jan. 1, 1920. A great many of the country's large industries have greatly benefited by Technology-trained men, and these industries consequently feel a distinct obligation to the school and stand ready to contribute to its funds. It is necessary, however, to secure the authorization of stockholders for corporation gifts, and the short space of time permitted for Technology's efforts makes this difficult. The Technology Plan, as it is called, has therefore been devised, which constitutes a contract between the Institute and the corporation to provide definite service for a definite retaining fee. In this way all appearances of philanthropy are removed, and it is hoped that large use will be made of the facilities that Technology thus places at industry's disposal.

In brief, the school agrees to permit the corporation retaining it to make use of its extensive library, files and plant, and to consult with members of the staff and faculty on problems pertaining immediately to the business of the company. In addition, a record of the qualifications, experiences and special knowledge of the Alumni will be made available, advice will be given as to where special knowledge on any given subject may be obtained, and the first opportunity of securing the services of Technology men will be offered the corporation subscribing for the service.

The plan has a far broader aspect than a means of increasing the endowment fund. It is in accord with the tendency of the day to establish our economic life on a firmer foundation, to make available for the benefit of the public the valuable results of the research conducted by scientific men, and a successful application of the plan holds promise for the development of American enterprises that cannot be overestimated.



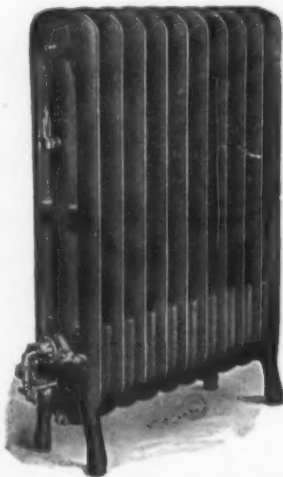
Save Money for Your Clients

by reducing their coal bills this winter. You can enable them to heat their homes quickly and thoroughly with less trouble and expense, and win their confidence, gratitude and recommendations by specifying

CLOW

"Gasteam" Radiators

Each radiator is a complete, permanent heating unit, or may also be an efficient part of a steam or hot water system. A "Gasteam" saves the needless expense of starting the furnace or boiler. Heat only when and where wanted. Can be used in any type of structure. Installation is easy and simple. Only a gas connection is needed. Nothing to get out of order.



"Gasteam" radiators are absolutely odorless, no dust, smoke, ashes or labor. A match starts it — gas flow automatically controlled, maintaining an even temperature.

"Gasteam" radiators are attractive in appearance and come in a variety of standard sizes.

Send for your "Gasteam" catalogue to-day.

JAMES B. CLOW & SONS

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Our reputation is worth more
than our plant—

And our plant is the best that money and
experience can build.

Products of our plant that contribute to your reputation and ours

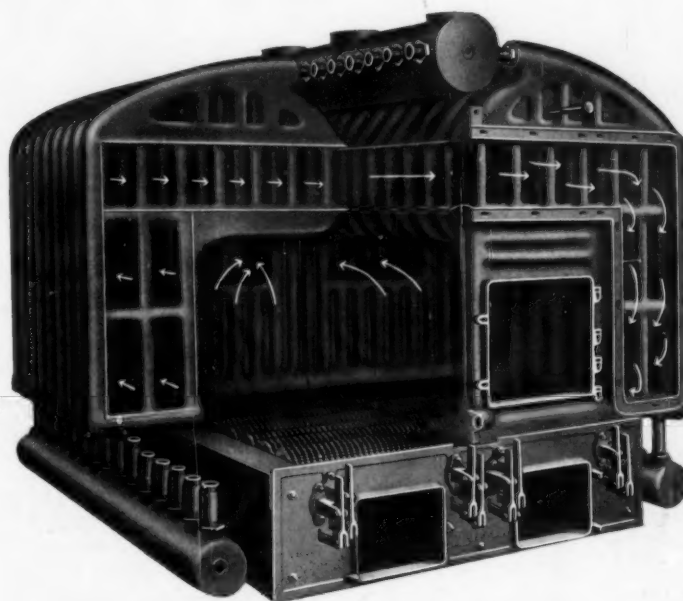
Boilers

SECTIONAL
MILLS WATER
TUBE

SMITH
With or without
Smokeless Furnace

MERCER
W-17 SMITH
SERVICE
ROUND

H-B
and
MENLO



No. 60 Smith Boiler with Smokeless Furnace

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To obtain and hold the reputation now enjoyed by
The H. B. Smith Company has been possible only
by superior quality of product, prompt and efficient
conduct of business, financial strength, insistence on
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Builders Hardware

Since 1839

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A Suitable Article
For Every Need

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HARVARD CLUB BOSTON, MASS.

*Parker, Thomas & Rice,
Architects*



EQUIPPED WITH WESTERN ELECTRIC FLIP SWITCHES

TYPE B CAST

The FLIP SWITCH

Was selected for installation in the home of the Harvard Club in Boston, Mass. because it lent itself to the artistic scheme of decoration.

The Western Electric Flip Switch is designed with one metal lever; it is flipped up and down, turning the lights on and off. Architects who give special attention to the finer details have long appreciated that this is the correct way to design a switch.

There are no screws to mar the face of the plate. This plate is held securely by a lock nut which is covered by a small metal escutcheon. The switch plate is therefore always true to the wall even though the switch may be on a slight angle.

There is a type of Western Electric Flip Switch that will meet the most exacting needs of any architect or builder. The Type B plate featured in this advertisement is only one of many styles. Standard finishes are brush and polished brass. Special finishes such as verde antique, old iron, copper, white enamel, nickel, silver and others may be had.

Western Electric Flip Switches are built in single and double pole, three and four-way types with tandem and gang plates.

Western Electric Flip Switches cost no more than the ordinary push button type.

Western Electric Company

New York
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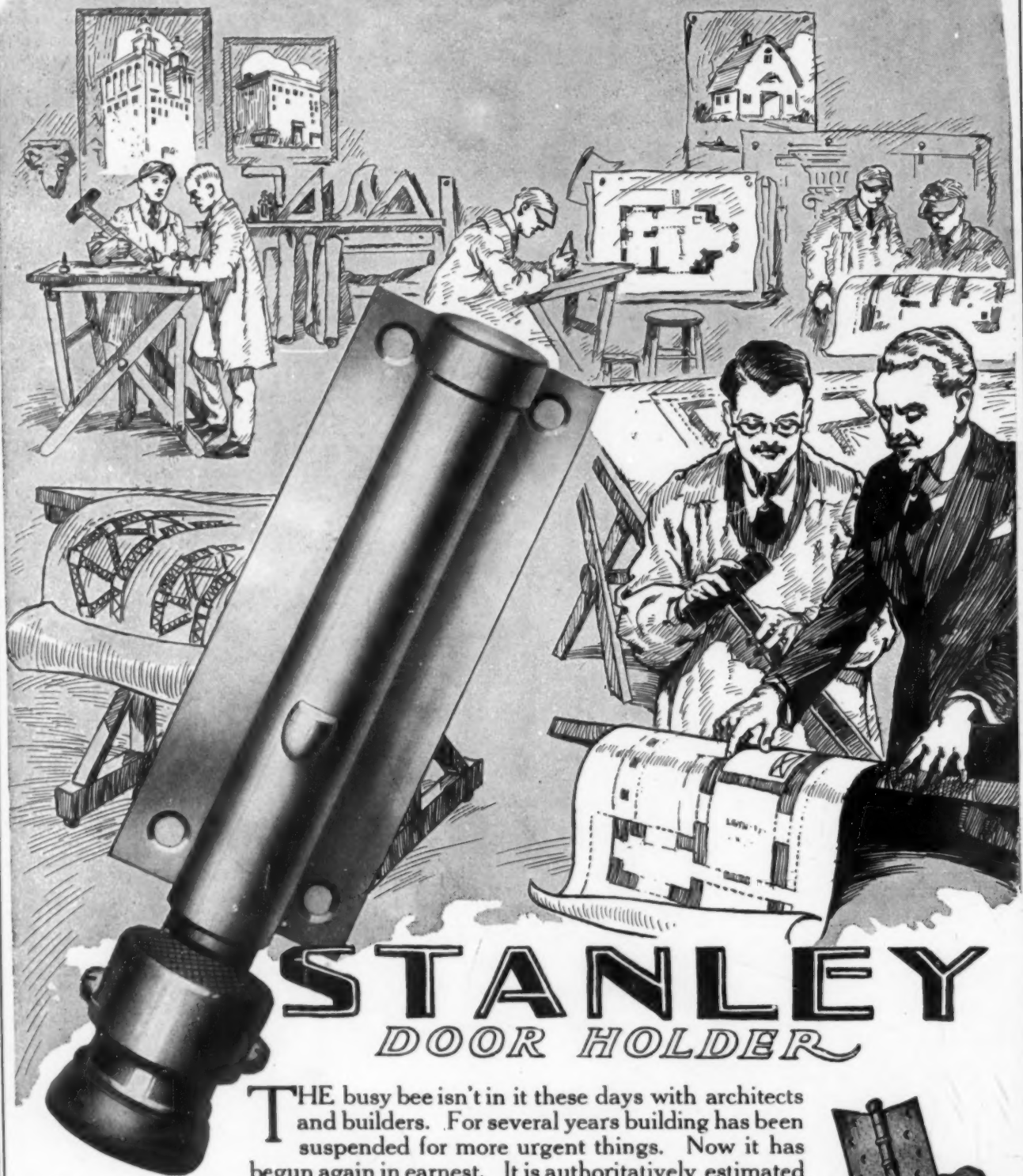
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EQUIPMENT FOR EVERY ELECTRICAL NEED



STANLEY

DOOR HOLDER

Stanley Door Holder
No. 456

A slight pressure by the
foot on the trip knob
holds or releases the
holder.

NEW YORK
100 Lafayette Street
CHICAGO
73 East Lake Street

THE busy bee isn't in it these days with architects and builders. For several years building has been suspended for more urgent things. Now it has begun again in earnest. It is authoritatively estimated that the United States at the present time faces a building shortage equivalent to the needs of over four million people. An era of big building unquestionably is at hand.

You will be interested in our book entitled "Buildings You Have Seen."
We will be pleased to send you a copy, postage paid, on request.

THE STANLEY WORKS
NEW BRITAIN, CONN.





SARGENT
HARDWARE

UNITED STATES POST OFFICE AND CUSTOM HOUSE
NEW HAVEN, CONN.

JAMES GAMBLE ROGERS
Architect

The requirements of the government for public buildings
have been fully met in this monumental edifice.

SARGENT

HARDWARE *and* LOCKS

are used throughout to provide the necessary security
and convenience of operation, as well as to furnish a
harmonious decorative treatment.

SARGENT & COMPANY

Makers of Locks and Fine Hardware

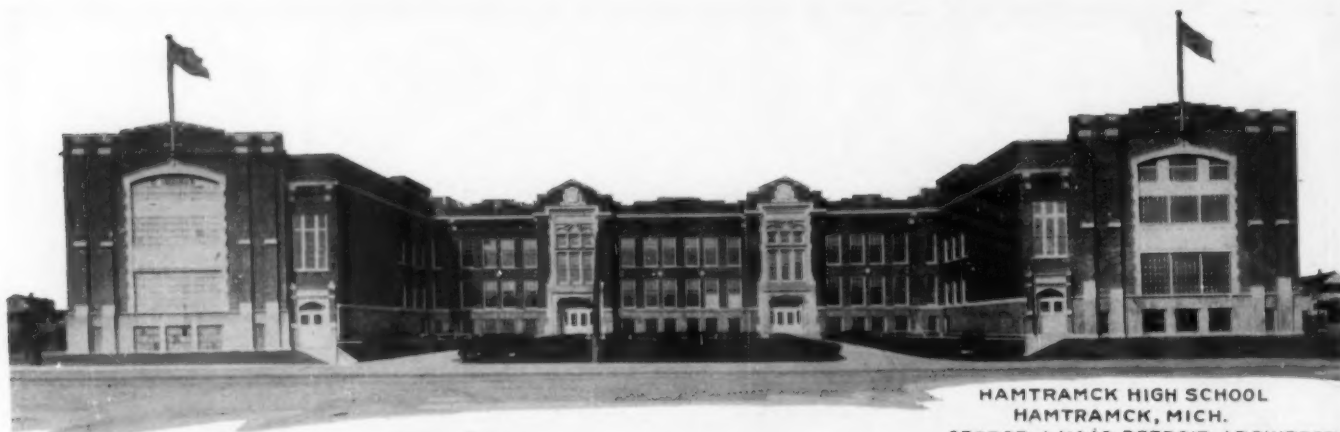
NEW HAVEN, CONN.

New York

Boston

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Sargent Hardware is sold in all cities by representative dealers



HAMTRAMCK HIGH SCHOOL
HAMTRAMCK, MICH.
GEORGE J. HAAS, DETROIT, ARCHITECT.

PROTECTING YOUNG LIVES

The protection of school children from the dangers of fire-panic, as well as fire, is a sacred duty which architects respect. To-day nearly every new schoolhouse is equipped with

Von Duprin

Self-Releasing Fire Exit Latches

In theatres, hospitals, hotels, large stores, office buildings and factories there is as great a need for protection from fire-panic as in schoolhouses, and in this work Von Duprins are giving satisfactory, never-failing service.

Let us send you catalog 12-F, or see "Sweet's," pages 792-797.

VONNEGUT HARDWARE CO.

Indianapolis, Ind.



“This is a RAYMOND feature!”

After we drive the shell—*after* we collapse and withdraw the core—*after* the driven shell has been left open for inspection—then this *shell*, remaining in the ground, is filled up with concrete. The concrete is not poured into a mere hole in the earth, but into this spirally reinforced steel “form,” which protects it until the concrete column has thoroughly solidified. Simply specify “Concrete Piles formed by the Raymond Method.”

Write for the Raymond Book

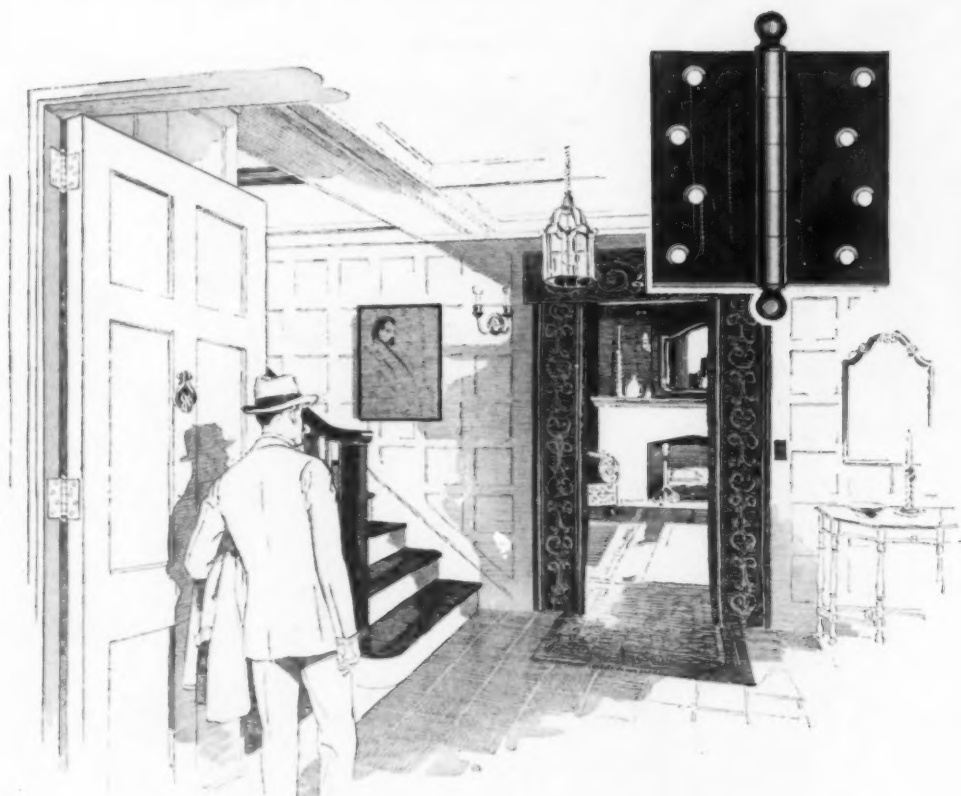
RAYMOND CONCRETE PILE COMPANY

New York: 140 Cedar Street

Chicago: 111 West Monroe Street

Raymond Concrete Pile Co., Ltd.
Montreal, Canada

A Form for Every Pile—A Pile for Every Purpose



McKINNEY BUTTS

For all doors

No embarrassing complaints are ever heard by the architect or contractor who specifies and uses McKinney hinges and butts.

Doors hung in a careful and workmanlike manner contribute not a little to the success of every new building, and McKinney-hung doors can be depended upon to swing easily and quietly, not for a few brief months only, but for many years to come.

Specify McKinney hinges and butts for all doors—they are sold by all good dealers the country over. Interesting butt booklet will be sent gladly on request.

McKINNEY MANUFACTURING COMPANY

WROUGHT STEEL  BUILDERS' HARDWARE

PITTSBURGH, PA.



Waterproof

For years NEPONSET Black Waterproof Building Paper has been specified by architects for use back of stucco, underneath clapboards, beneath roofing and between floors because—it is waterproof, airproof and keeps out moisture, draughts, cold, heat and dust.

Contractors can easily secure it from their local hardware or lumber dealers.

Make your own tests of NEPONSET'S waterproof qualities by immersing a sample in a pail of water.

Send for samples and full particulars.

NEPONSET

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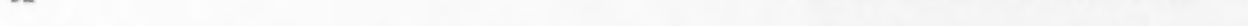
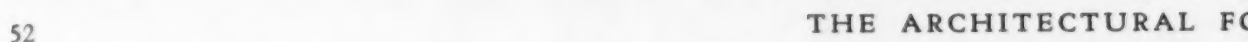
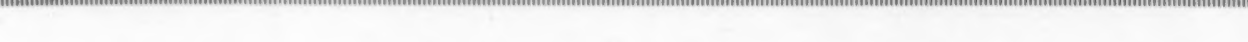
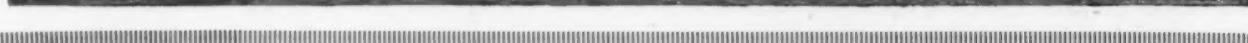
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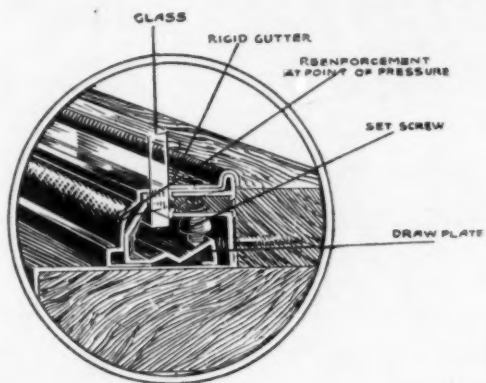


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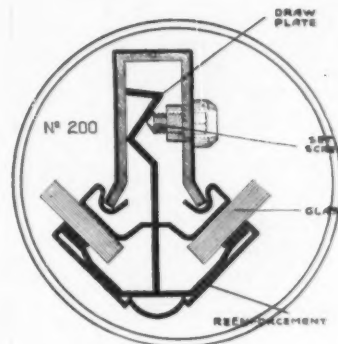


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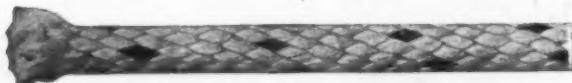
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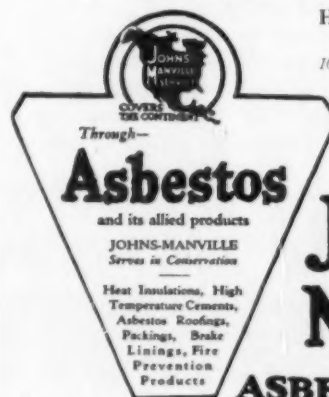
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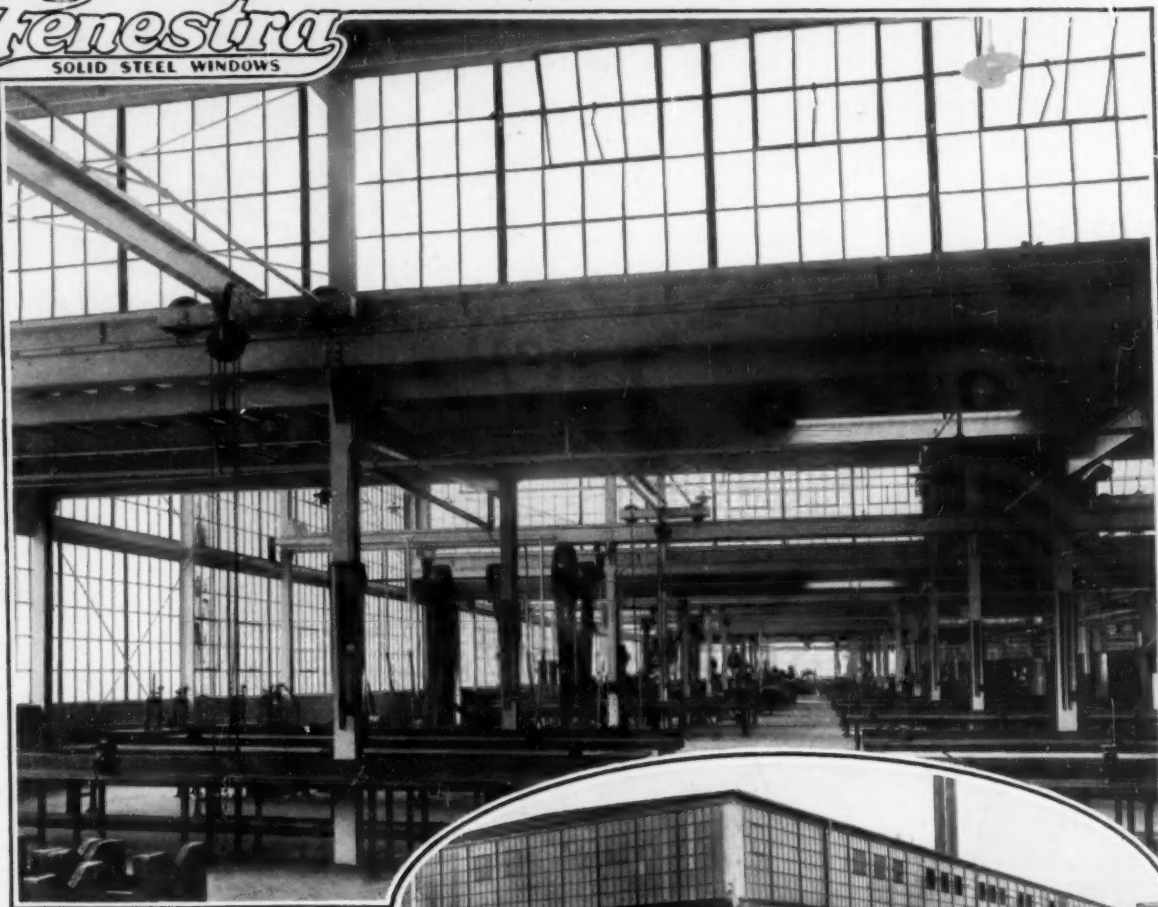
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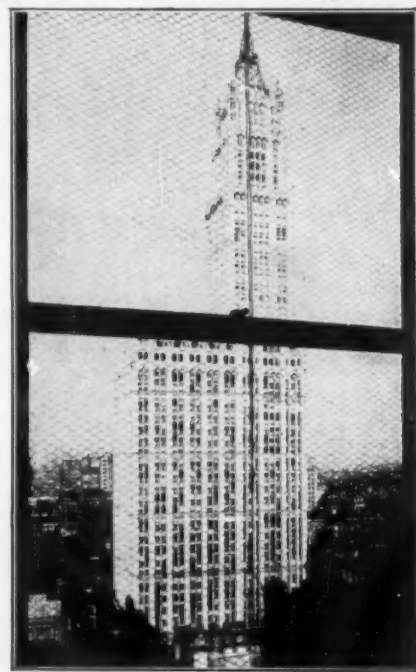
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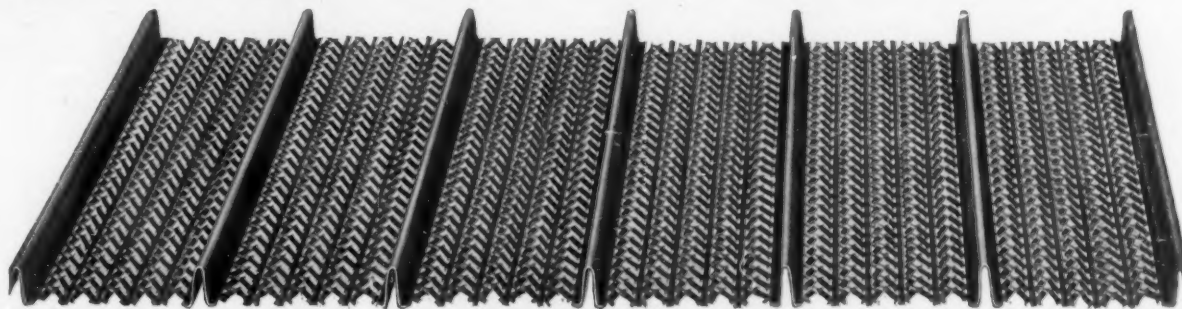
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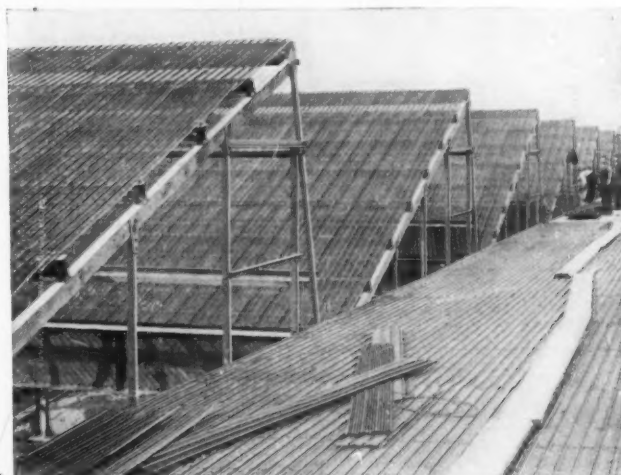
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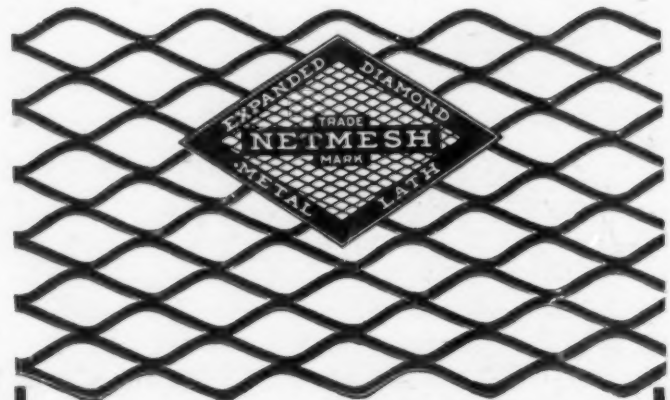
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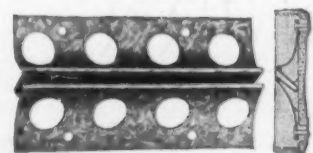
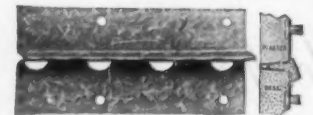


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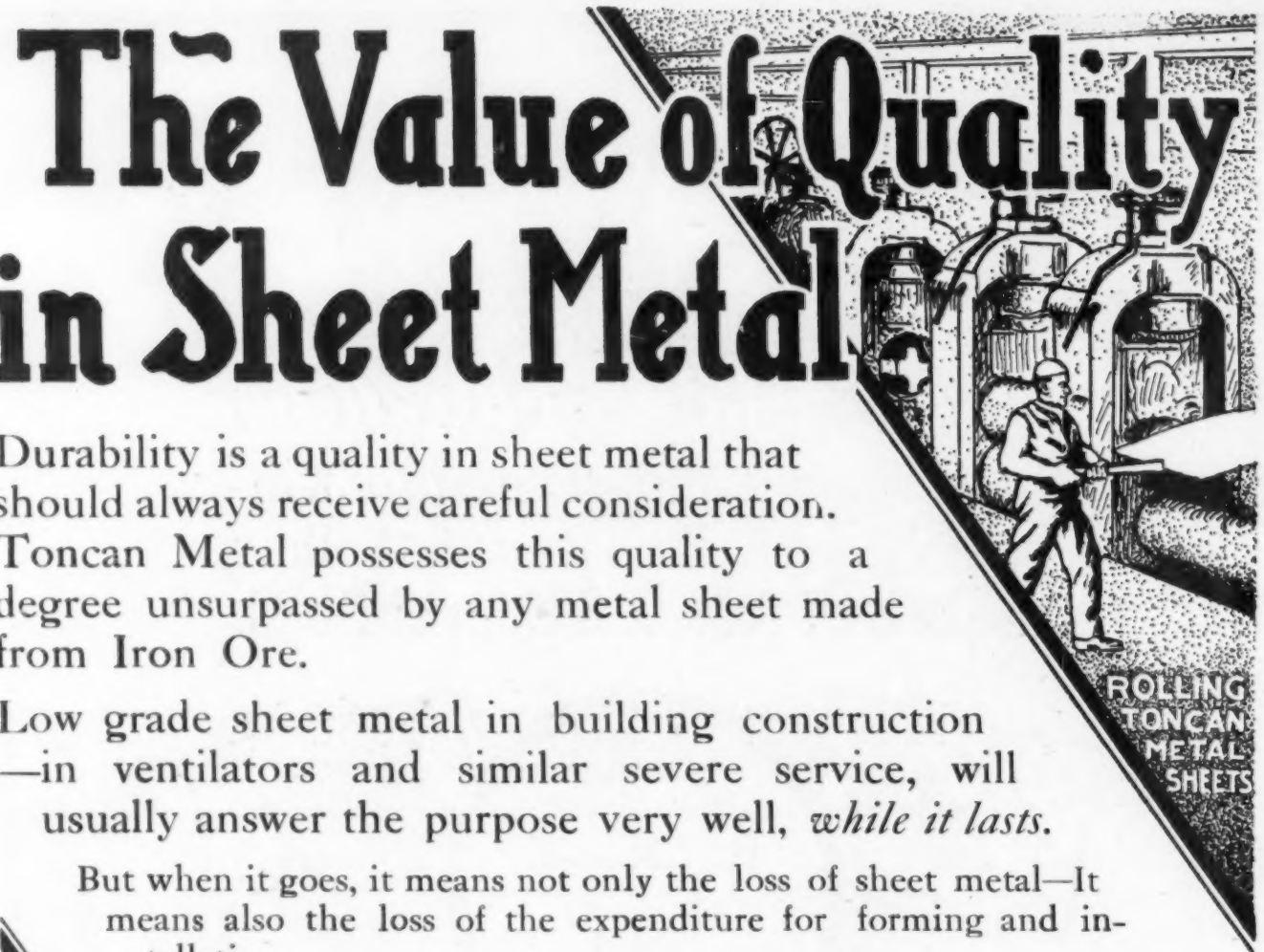
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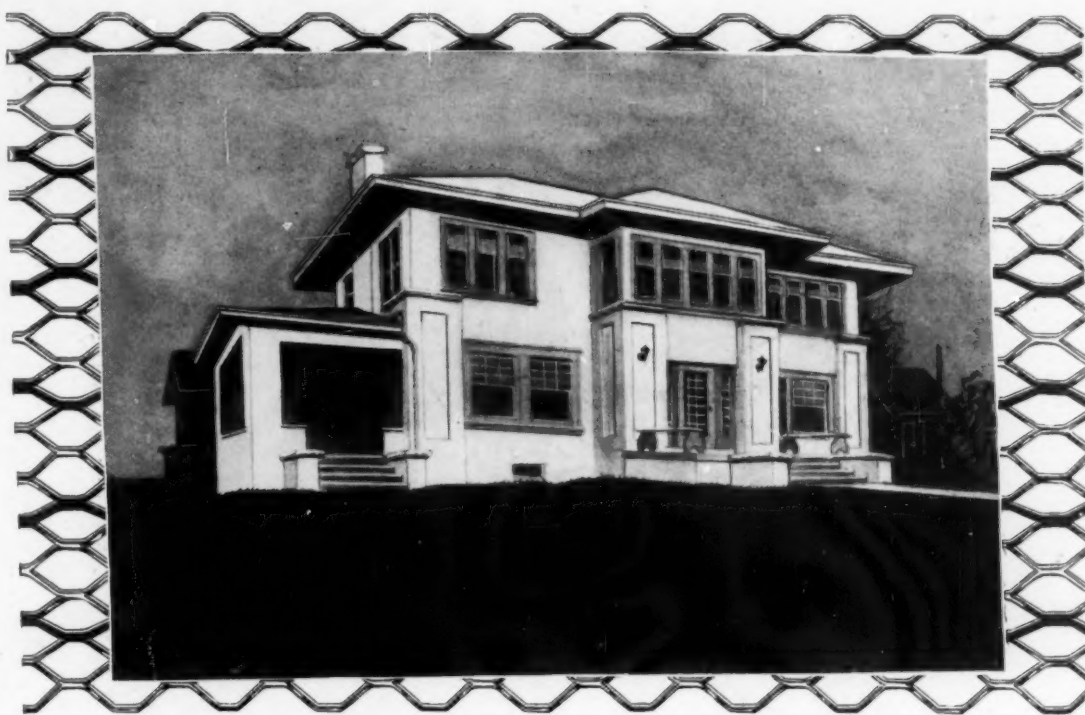
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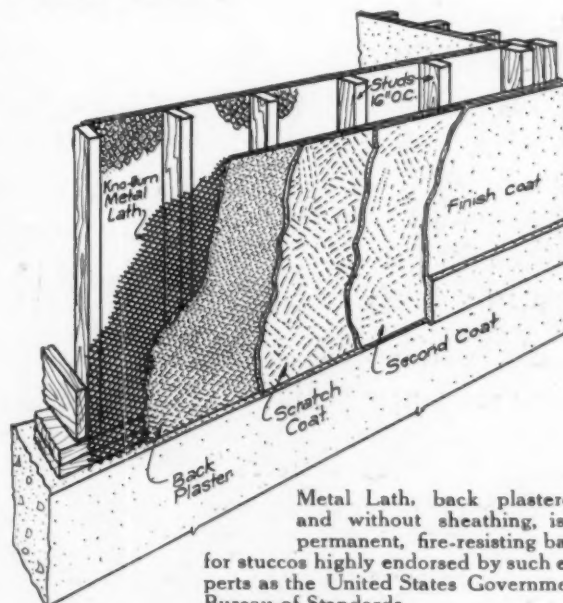
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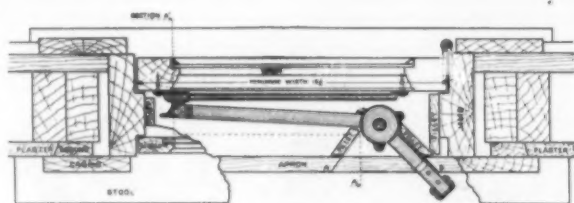
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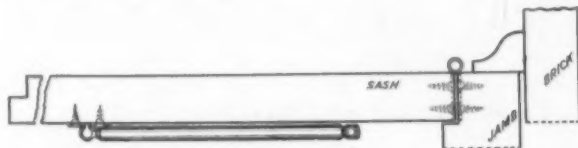
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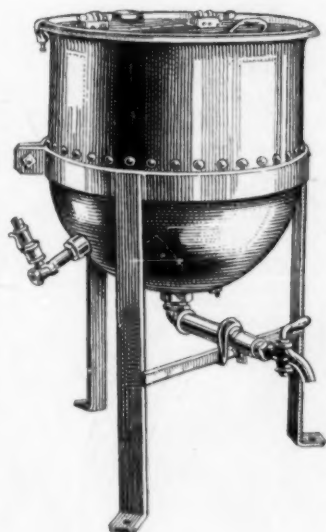
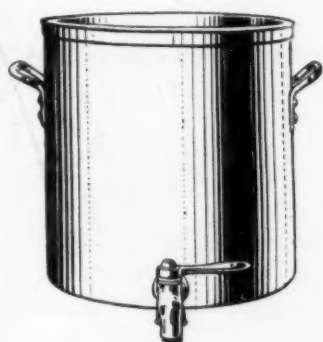
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Typical of the high standard maintained by the Robert Treat Hotel in its furnishings and equipment is the presence of "Wear-Ever" aluminum cooking utensils in the Robert Treat kitchens.

This equipment has been in use since the hotel opened. An additional kitchen now being built also will be equipped with "Wear-Ever."

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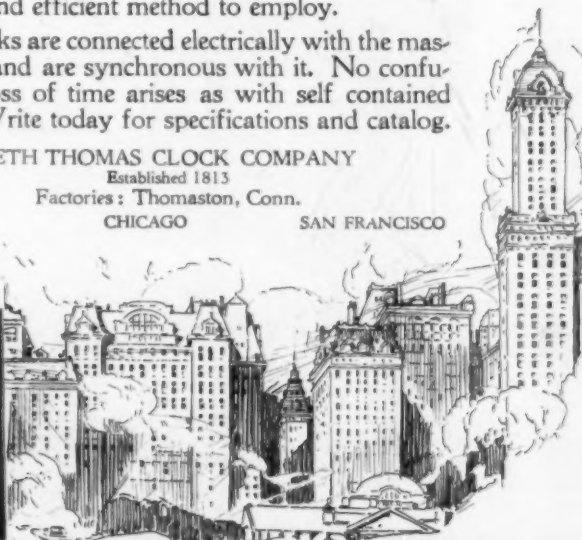
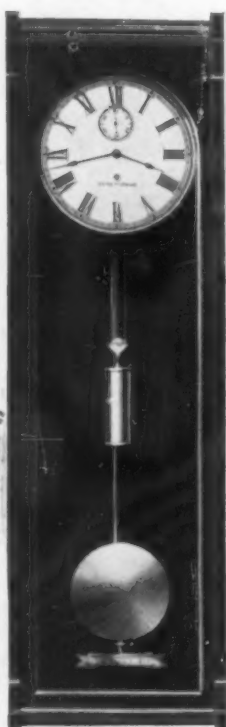
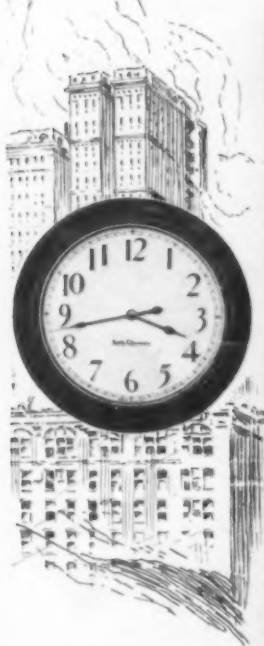
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and discriminating purchase of standard materials on the part of the contractor.

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Controls the Efficiency of Every Modern Building

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The Electric Cable Company, maker of ECCO wire, is engaged solely in the manufacture and marketing of insulated wire. There is no division of energy or responsibility. To successful specialization in production and fair dealing with the electrical industry is due the fact that today—

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ECCO Dependable Insulated WIRE

THE ELECTRIC CABLE COMPANY, 10 East 43rd Street, New York City
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ECCO Dependable Insulated WIRE

You Can Let Your Clients Say: "Good-Bye, Garbage Man!"

Successful domestic incineration is an accomplished fact. The Kernerator is now used in 85% of the new homes and apartment houses in cities where this company is established.

It burns all garbage and household waste, newspaper, wrapping paper, faded flowers, without the use of any commercial fuel — not one penny for operating cost. The

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The Kernerator is built in a special enlargement of the chimney base and requires but little additional masonry work.

Sanitary - Economical - Convenient - Odorless

KERNERATOR
Built-in-the-Chimney

See page 1132, Sweet's 1919 Catalog

THE KERNER INCINERATOR CO.

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You owe it to yourself as well as to your client to provide positive fire protection.

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Patented

VIEWED from the standpoint of economy and efficiency, "Star" Ventilators assure the most inexpensive ventilator investment procurable.

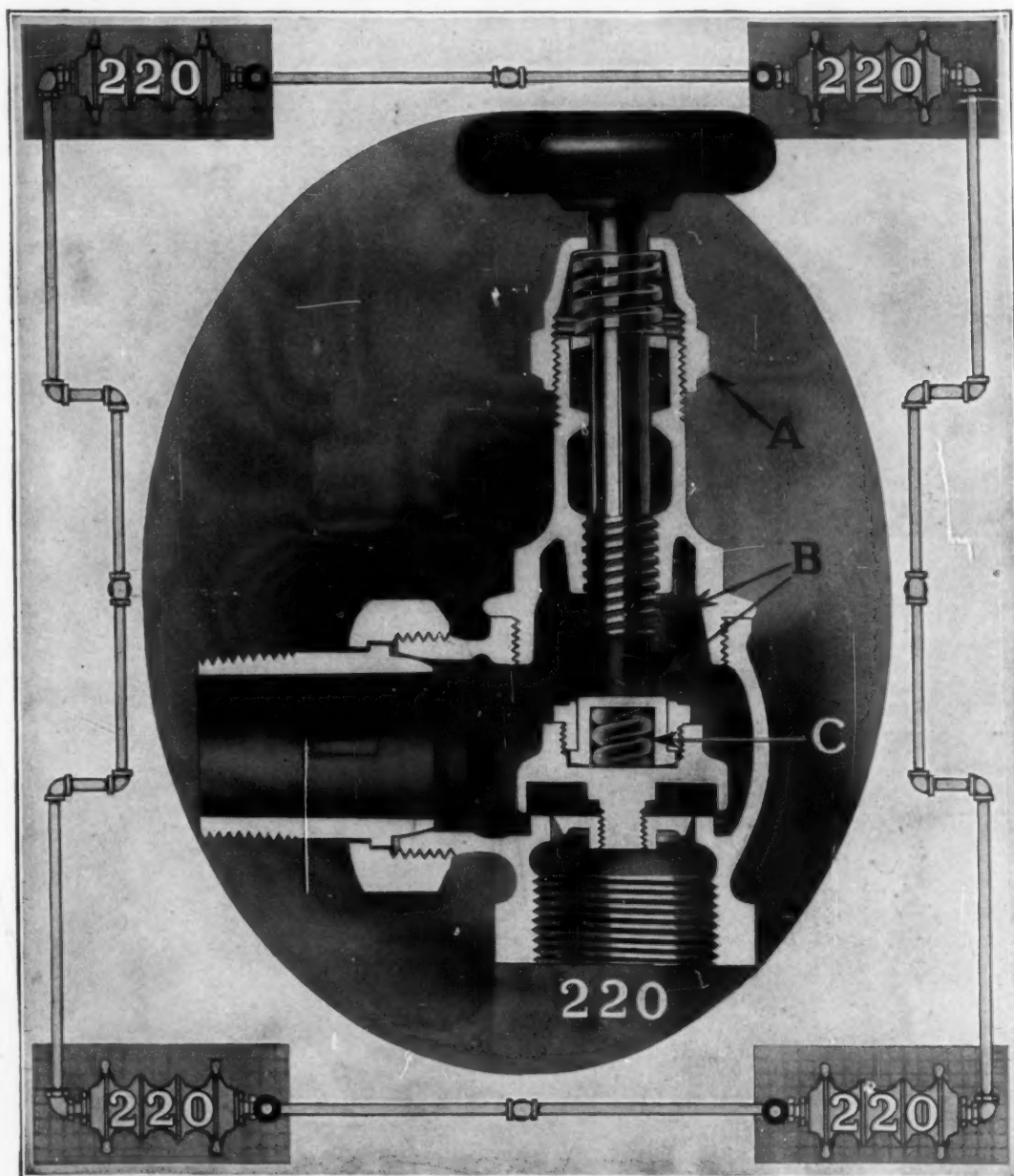
The United States Government adopted the "Star" Ventilator as its War Standard after competitive tests and has used thousands for cantonments, warehouses and other important buildings.

Place our Ventilator Booklet in your files

MERCHANT & EVANS CO.

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*The Perfect Radiator Valve***CRANE - 220**

A—Special Stuffing Box is always tight. B—Crane Patent Stop prevents jamming. C—Disc Spring prevents leaks.

The Stuffing Box is specially designed for radiator valve service. It is not packless but it will outlast and stay tight longer than any other stuffing box irrespective of the design, name or packless features.

Use it on any steam, vapor or vacuum job.

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There's a Definite Need for the G & G Hoist in SCHOOLS - COURT HOUSES - OFFICE BUILDINGS

ASH removal is a special problem. Old methods were wasteful of labor and time—and often dangerous. To-day the need for an efficient method for removing ashes from larger buildings is recognized. The most efficient method provides for the use of a

G & G TELESCOPIC HOIST

With Automatic Gear-Shifting Brake Device and Silencer

Ashes are quickly brought from basement to street or wagon top. One or two men now do all the work and do it better than two to five men under former conditions.

Ten models—electric and manual power. Architects now provide the standard 4 x 4 ft. hoist way. When writing please tell us the particular work to be performed and distance of lift.

Illustration:—
Model A Hoist
with Automatic
Gear-Shifting
Brake Device
and Silencer.

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Power Plant Specialists since 1866

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AGENCIES IN PRINCIPAL CITIES

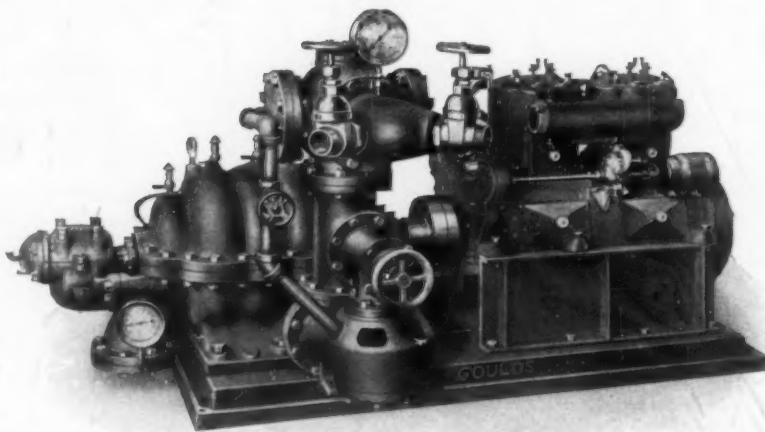
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Goulds Centrifugal Fire Pump

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These outfits can also be furnished without the underwriters fittings for general pumping services. They can be furnished with or without electric self-starters as desired.



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The Goulds Manufacturing Company

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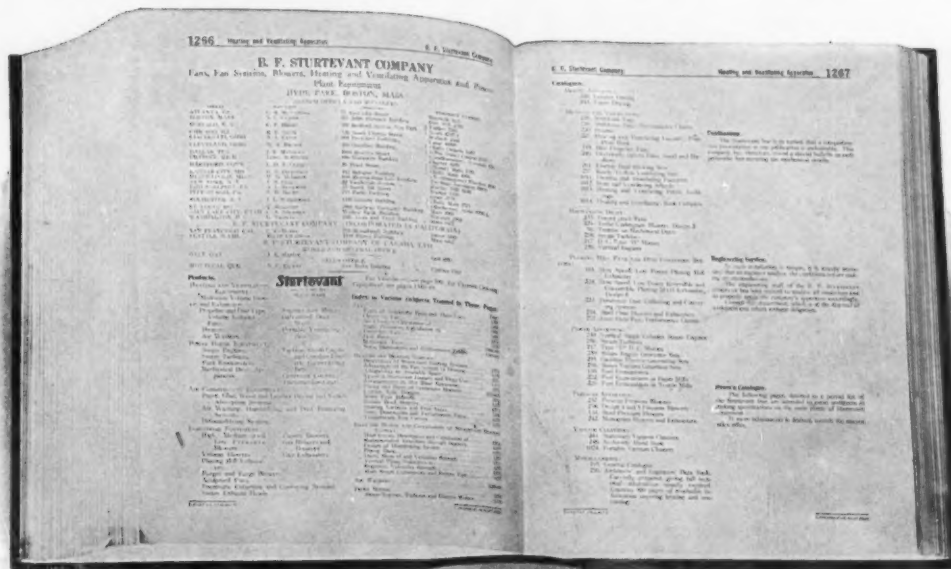
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These pages are filled with the sort of facts which enable you at short notice and with minimum effort to choose the unit best suited to your need.

Furthermore, a distinct personal service is at your disposal through the Sturtevant Engineering Organization made up of specially trained men who are eminently qualified to make recommendations which are accurate and unbiased. These engineers are located in 23 of the largest cities in the United States. There is one near you. Confer with him.

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They are properly designed and sturdily built.

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Offices in all principal cities

Whitlock Heaters have everlasting copper tubes



ROYAL Ventilators

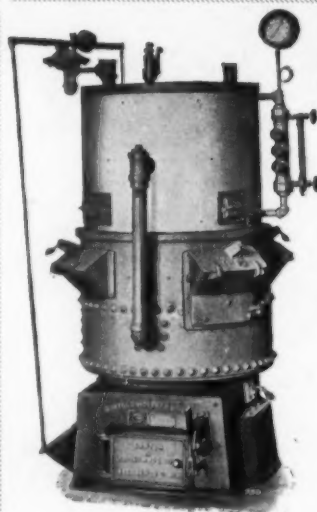
Efficiency, strength and durability are features of the ROYAL. They combine to make for popularity.

No ventilator is made with greater regard to proportion or with greater regard to superiority in detail. It has fewer parts than others; is proportionately lighter and is neat and graceful in appearance.

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of the Gorton Self-Feeding Boiler is demonstrated by the fact that many of the boilers installed over 25 years ago are still in use giving entire satisfaction.

Efficiency

The Gorton Self-Feeding Boilers are built on the lines of Power Boilers, using the same material, thus securing the greatest Strength, Durability and highest Efficiency.

The Gorton Self-Feeding Boiler gives a steady heat with attention only morning and night; its construction insures complete combustion of the gases and prevents the waste of coal.

See pages 2, 3, 4, 6, 8, 10, 11 and 13 of Catalog No. 88.

OUR NEW NO. 88 CATALOG IS READY—WILL BE SENT UPON REQUEST

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For Every Service

WHERE Jenkins Valves go in—trouble never appears. They are constructed against "break-downs." DEPENDABILITY is built into each valve. They are made to stand the severest conditions possible in the service for which they are recommended.

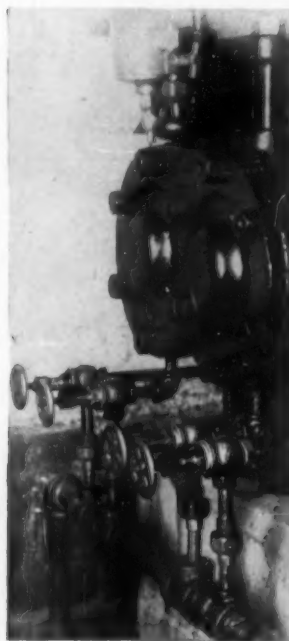
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It runs like a top—there is no vibration—the fan is practically noiseless.

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Is Important"*



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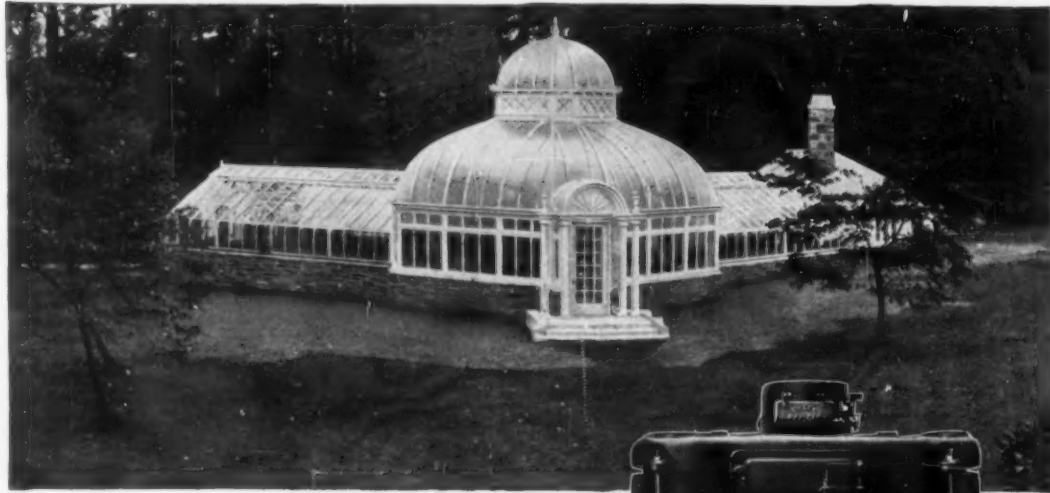
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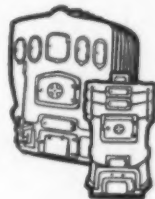
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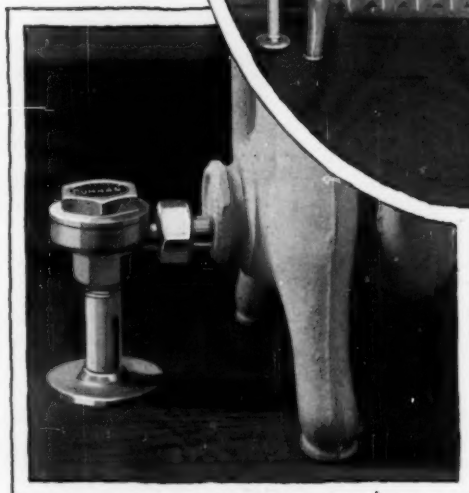
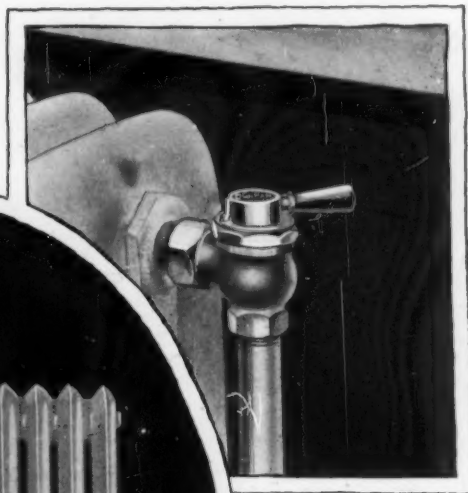
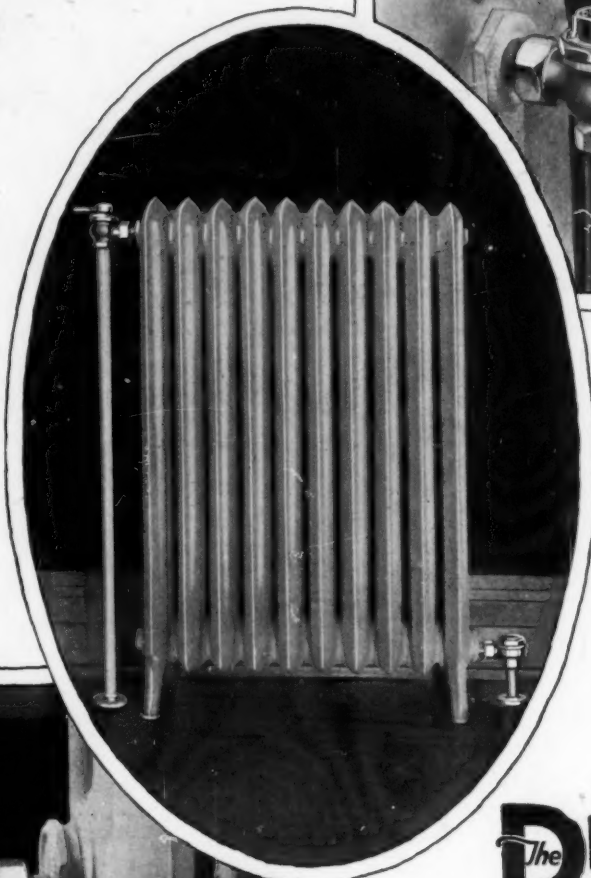


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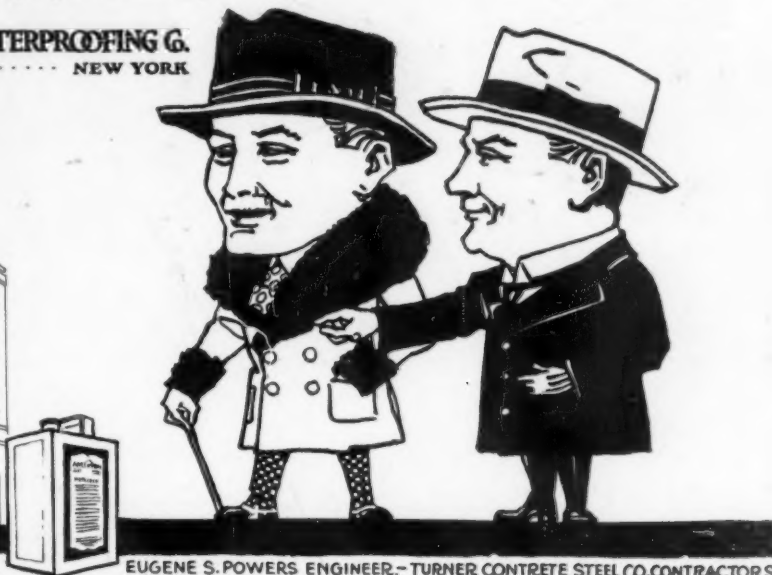
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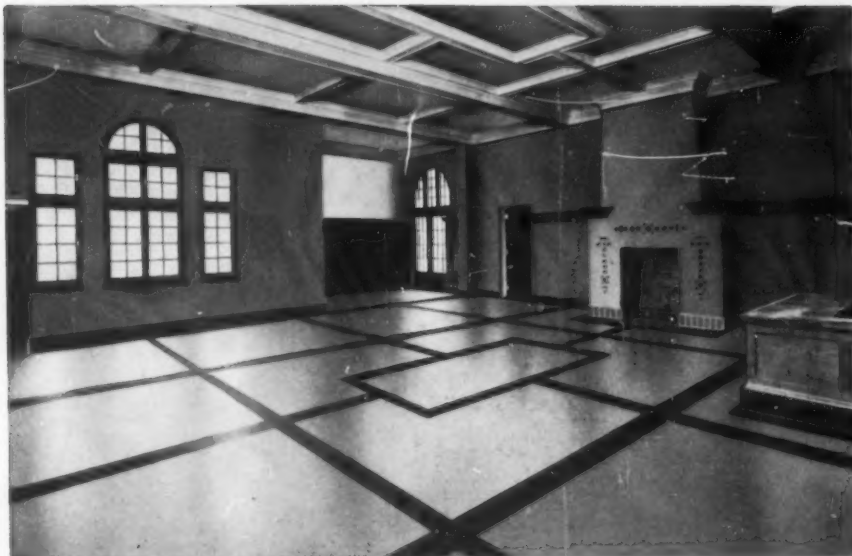
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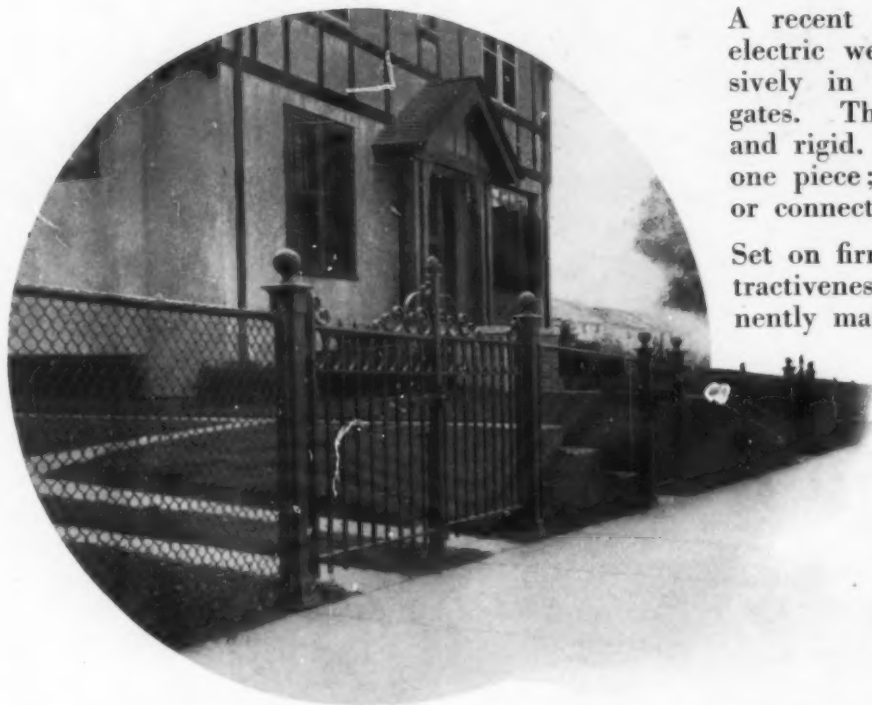
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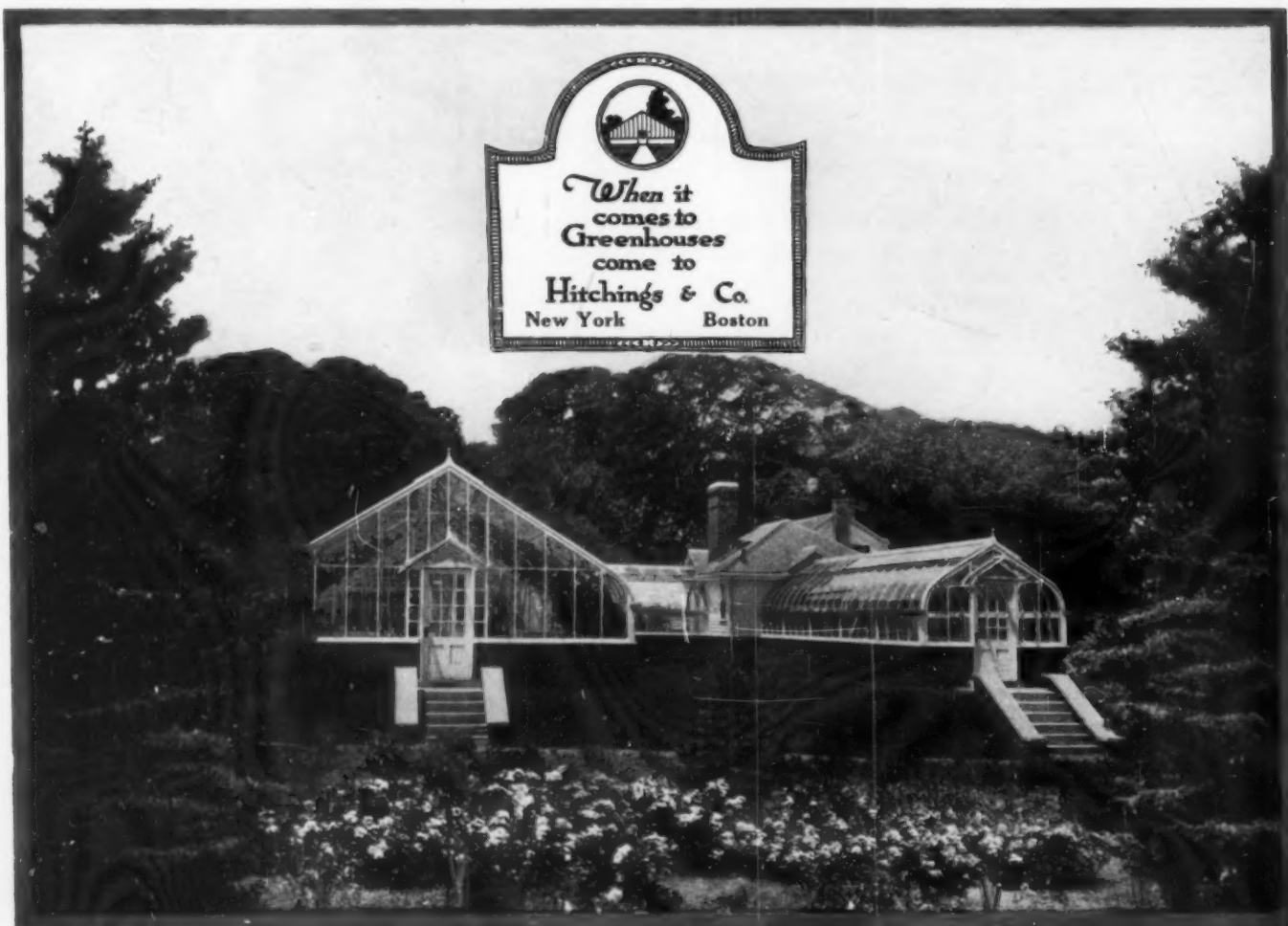
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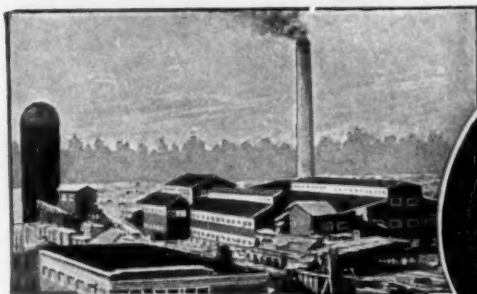
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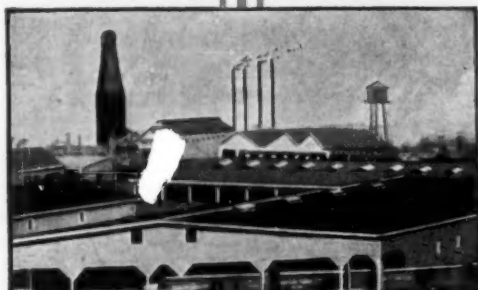




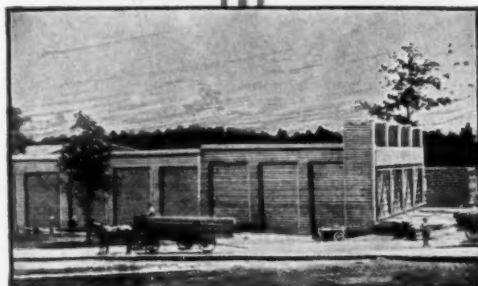
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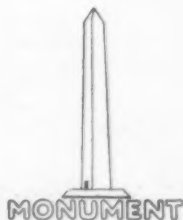
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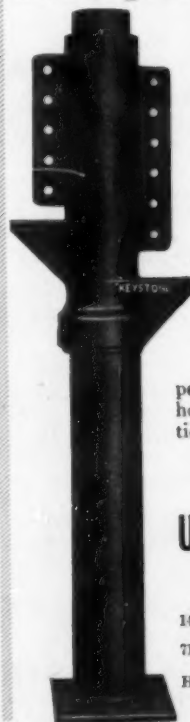
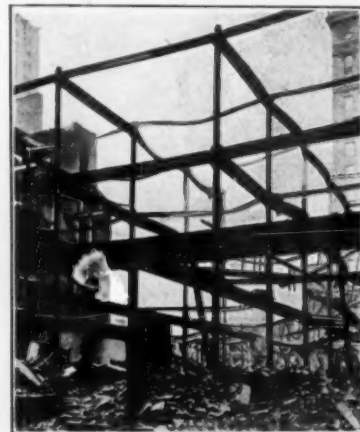
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SEPTEMBER, 1919

NUMBER 7

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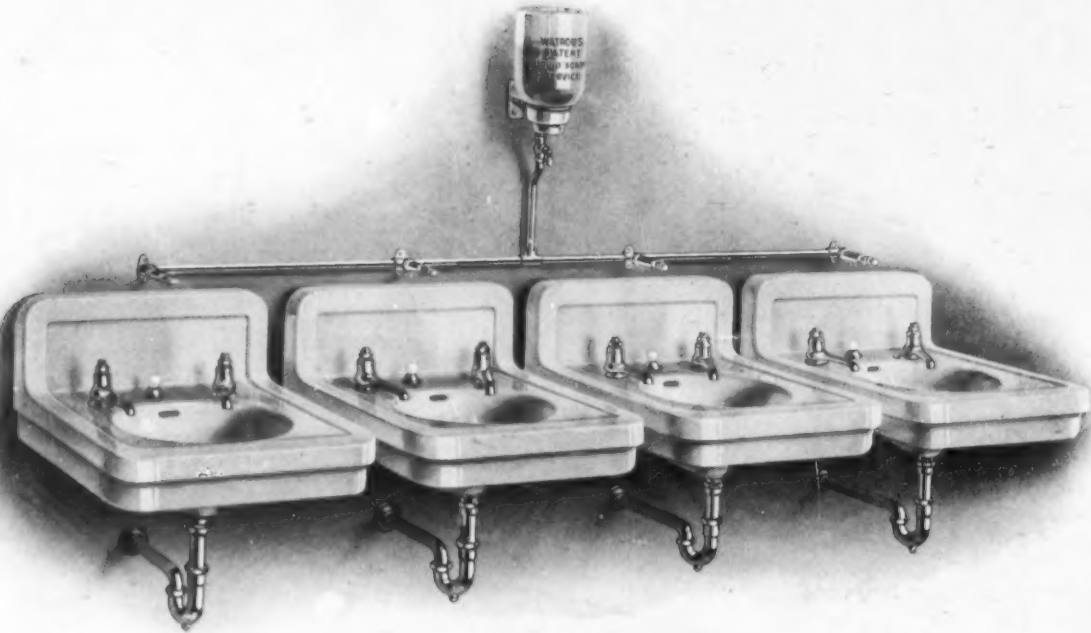
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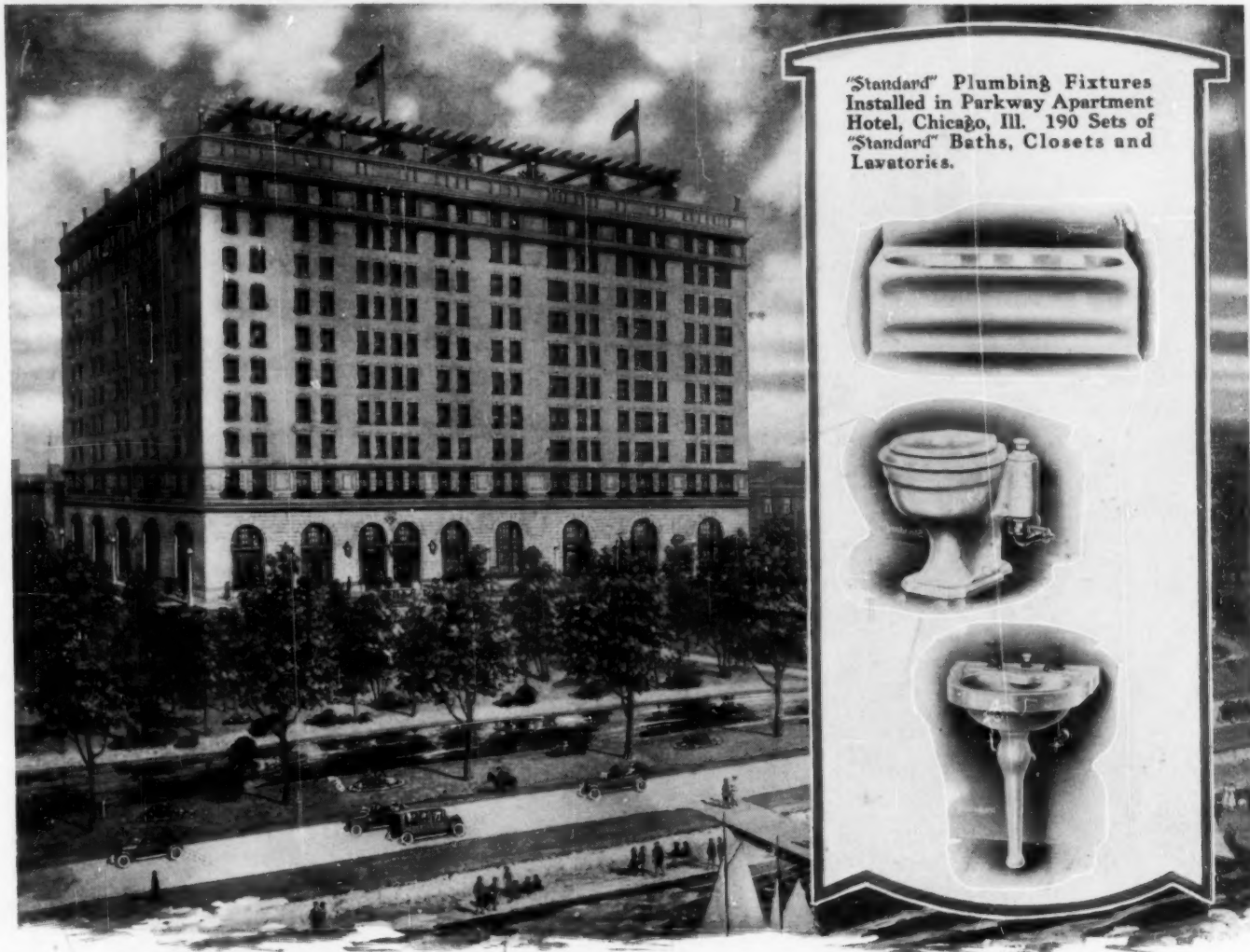
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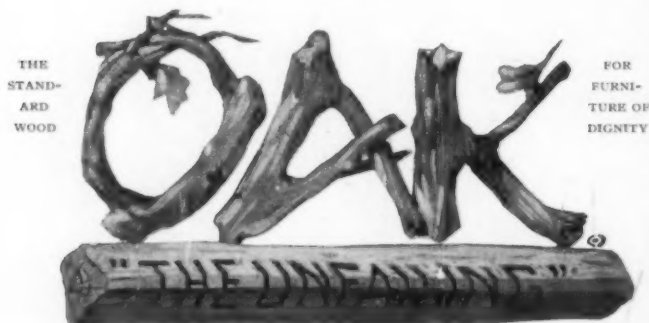
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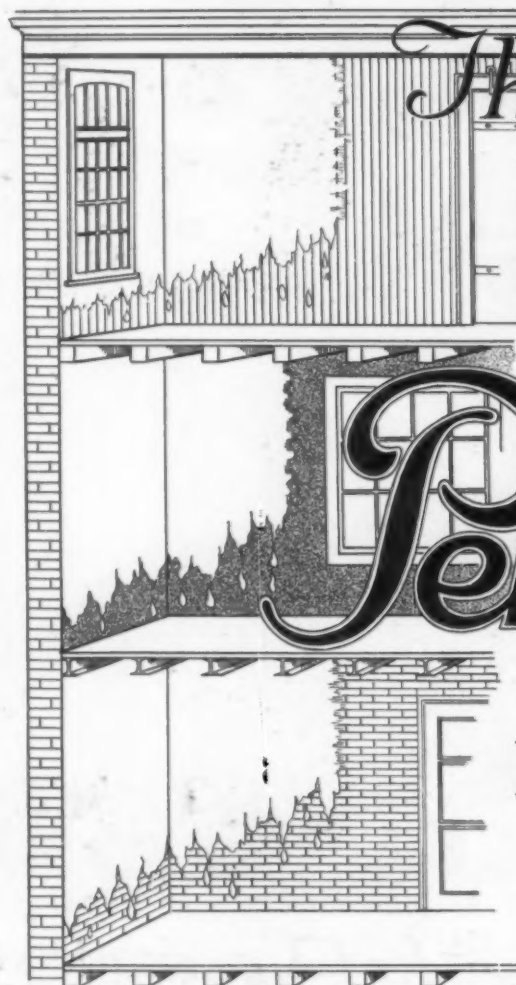
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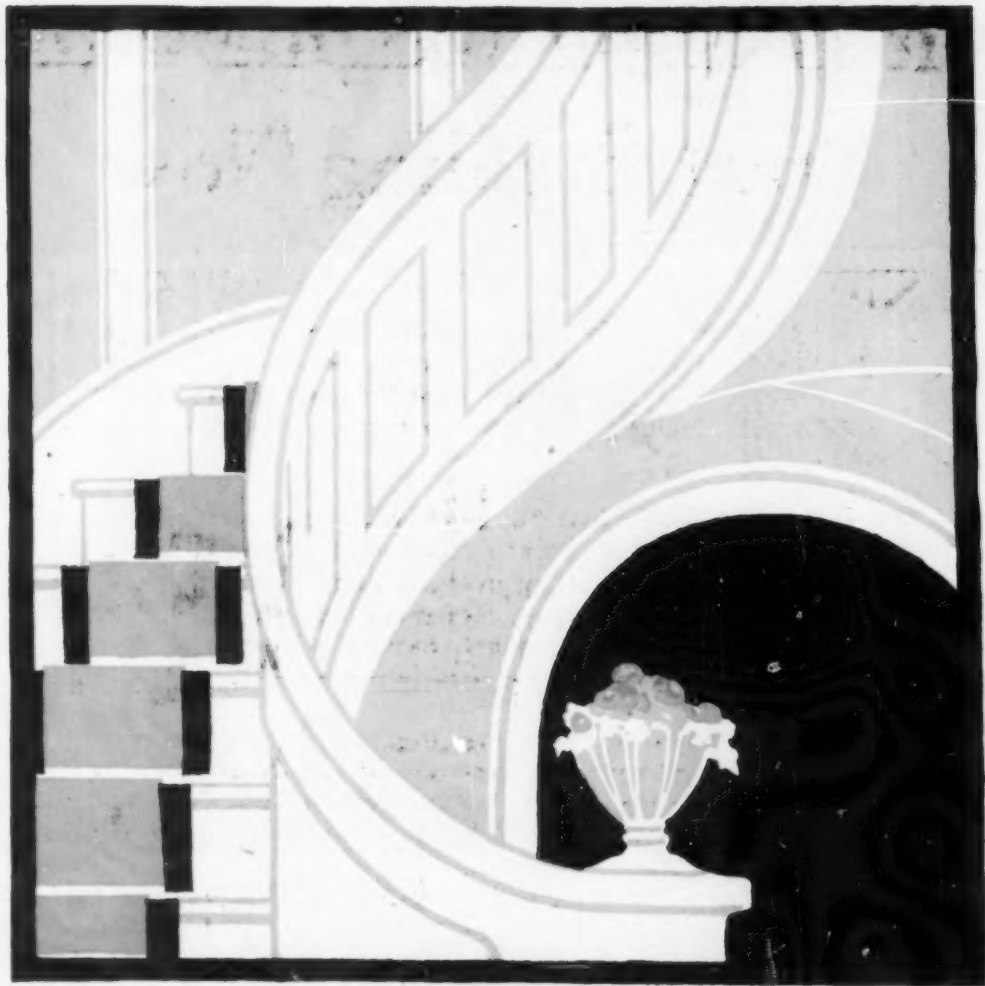
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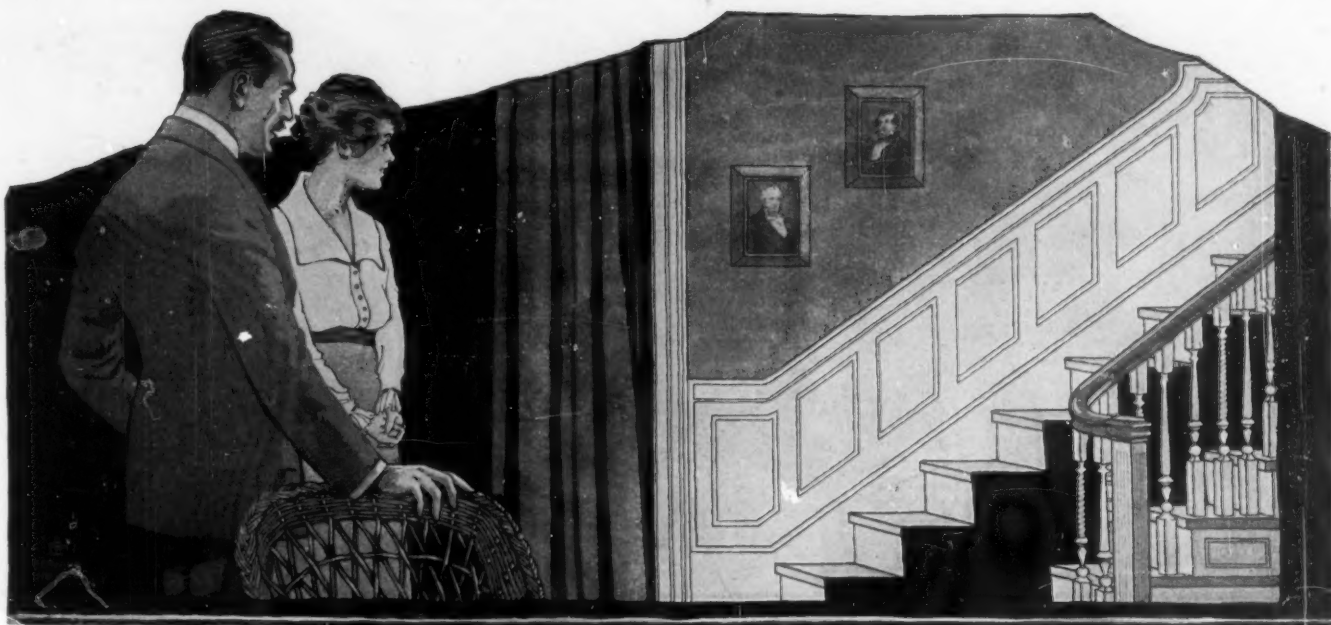
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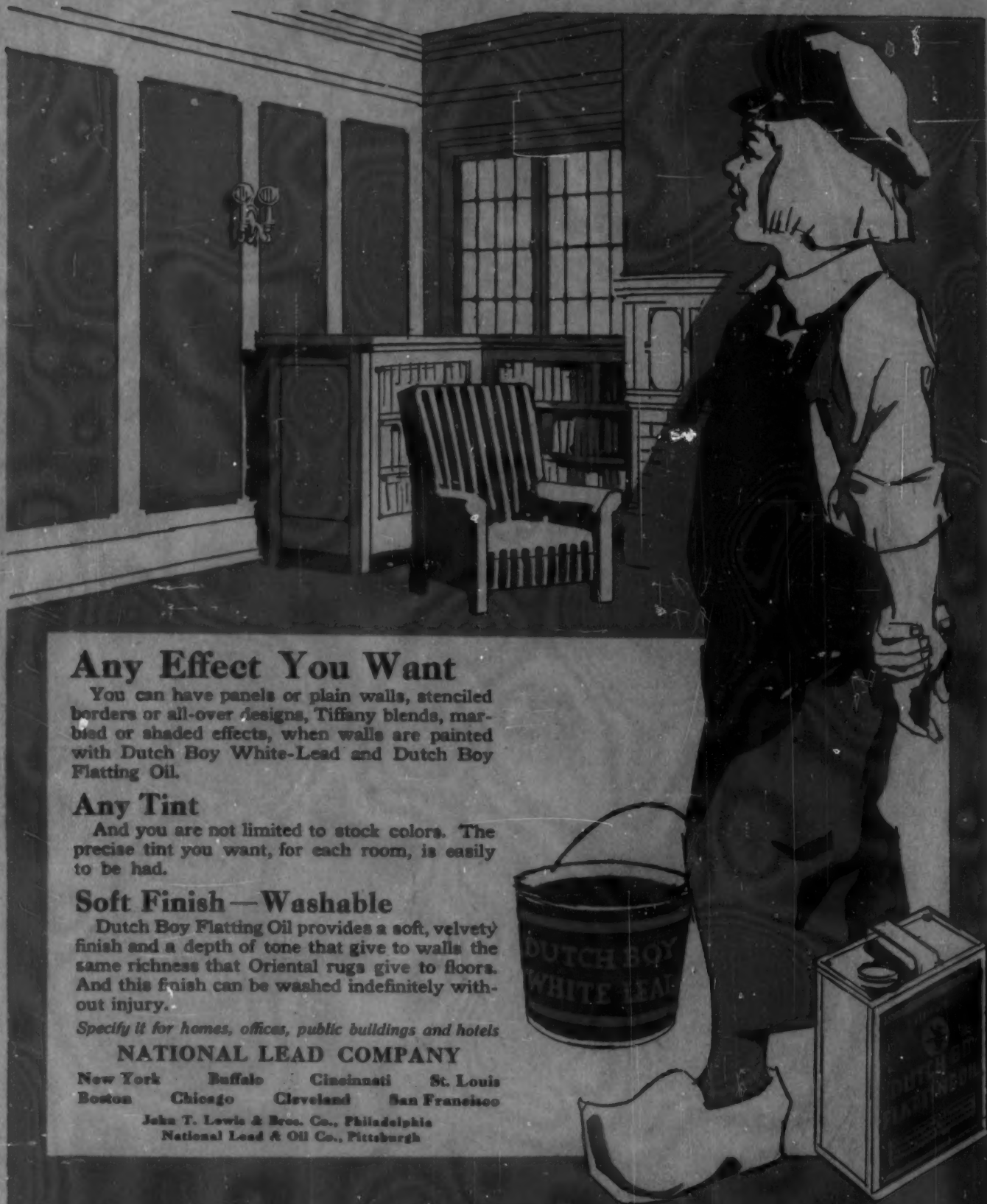


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